CAIS STANDARD MANUAL

SYSTEM NO. 25
COAL SITE
HANDLING AND STORAGE

CAS PROJECT
CAIS MANUAL

Issued April 28, 1995

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MEMORANDUM FOR DTIC-OCP
ATTN: Ms. Lue Lynch
8725 John J. Kingman Road, Suite 0944
Fort Belvoir, VA 22060-6218

FROM: AL/EQ (STINFO)
139 Barnes Drive. Suite 2
Tyndall AFB FL 32403-5323

SUBJECT: Transmision of Technical Documents

1. As per telephone conversation with Andrew Poulis, EQ/TIC, the attached CAIS CTDS manuals are forwarded for accession, cataloging, and microconversions. Please forward the accession numbers to:

Andrew Poulis
AL/EQ/TIC
139 Barnes Drive. Suite 2
Tyndall AFB, FL 32403-5323

2. The Distribution statement should read as follows: Approved for Public Release: Distribution Unlimited.

3. If you have questions about these documents, please contact Andrew Poulis at DSN 523-6285.

Larry L. Testerman

LARRY L. TESTERMAN
Scientific and Technical
Information Program Manager

Atchs: Manuals

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ABSTRACT

GENERAL ORGANIZATION

At this installation the list of facilities to be surveyed, including infrastructure, will be addressed on the basis of 32 unique systems that form the CAIS Engineering Deficiency Standards and Inspection Methods document. Each system deals with a specific technical aspect of the facility to be surveyed. Within each system a further breakdown is made to subsystems, each having a related list of components. Detailed observations of the listed defects are provided so as to allow the entry of observed quantification data. A DOD CAIS manual is provided for each of the 32 systems with an internal organization as outlined below:

INSPECTOR'S GUIDE

I. General
   - A. Level I Inspection Method Description
   - B. Level II Inspection Method Description
   - C. Level III Inspection Method Description

II. General Inspection
   - A. Process. This section describes the process of the inspection activity.
   - B. Location. This section describes the procedure for locating the inspection units in the facility or infrastructure on this installation.

III. Inspector Qualifications

This section notes the minimum qualifications for the person or persons performing the survey.

IV. Inspection Unit

This section describes how the IU (Inspection Unit) is determined for the particular component being surveyed.

V. Unit Costs

This section notes the nature of repair costs for this system.

VI. Standard Safety Requirements

This section lists safety procedures and equipment required to implement a safe environment for the conduct of this survey.

VII. Standard Tools

This section lists a set of standard tools required for the general conduct of this survey.

VIII. Special Tools and Equipment Requirements

This section refers to special tools or equipment requirements endemic to the nature of the system being surveyed.

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IX. Level II Inspection Method Keys
This section explains and locates Level II Key sheets.

X. Level III Inspection Method Keys
This section explains and locates Level III Key sheets.

XI. Repair/Replacement Cost
This section describes the nature and location of replacement cost data.

XII. Appendices
Appendix A. Provides a summary and definition of all abbreviations used both in the Standards and in the data base.

Appendix B. Provides a glossary of terms with their definitions as used in the Standard.

Appendix C. This section contains a listing of the average life cycle durations for each assembly* in the Standard.

* Assembly is a term describing the level at which replacement rather than repair occurs. This can be at the subsystem or component designation, depending on the system being surveyed.

SYSTEM TREE

The System Tree is a graphical representation of the Work Breakdown Structure, showing system, subsystem and component relationships for the Coal Site Handling and Storage System.

INSPECTION METHODS

Description
Describes the nature of what is to be condition surveyed.

Special Tool and Equipment Requirements
Lists any special tools required for this specific subsystem.

Special Safety Requirements
This section outlines any special safety measures or equipment required for this specific subsystem so as to maintain a safe environment and process in the conduct of the condition survey.

Component List
All components to be surveyed under this subsystem are listed here.

Related Subsystems
All other subsystems that have a survey relationship to this subsystem are listed here to help coordinate a complete and thorough condition assessment survey.

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Standard Inspection Procedure

This statement indicates the various levels of survey effort required for this subsystem.

Components

The previously listed components of this subsystem are described with a survey procedure recommended on a component by component basis. For each component there is a listing of defects with each defect broken down into observations describing the nature and severity of the defective condition observed. The surveyor enters a quantification value for each defect/observation encountered in the field CAIS device (DCD) to record the result of his survey.

References

This page lists the reference sources from which the foregoing subsystem data was developed.

Guide Sheet Control Number

This section lists the key numbers that tie the written Level II and Level III guide sheets to specific components in this subsystem.

Level II and Level III Inspection Method Guide Sheets

This section contains the detailed descriptions of the Level II and III survey and inspection procedures for this subsystem.

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INSPECTOR'S GUIDE

I. GENERAL

A. Level I Inspection Method

The Level I Inspection Method for Coal Site Storage and Handling consists of a thorough inspection of equipment used for receiving, storing, and dispensing coal as described in the work breakdown structure. The standard inspection is essentially a walk-by inspection with simple observations and measurements designed to be performed by one person. Some inspections, such as conveyors will require that the equipment be in operation (or manually operated) at the time of the inspection. The inspector shall not operate any equipment without the express permission and supervision of user personnel.

Coal Site Handling and Storage facilities are active structures subject to repeated loading, erosion, corrosion, and deterioration by wind, water, ice, and temperature. A well documented inspection will observe these deteriorations and identify needed repairs that, if carried out, can prevent structural failure and provide full life cycle usage of the facilities.

The observations recorded by the inspector during a Level I inspection are designed to create a historical data base for the continued design life of the facility, to highlight particular items which require inspection by a qualified engineer experienced in the design and construction of the facility (whichever is appropriate), and to devise maintenance and repair strategy.

B. Level II Inspection Method

A Level II inspection is performed to obtain additional information or measurements concerning a defect observed during the course of a Level I inspection. In all instances, a Level II inspection is additional work performed by inspection personnel during the performance of a Level I inspection.

C. Level III Inspection Method

Level III inspections shall be performed when triggered by conditions observed during a Level I or Level II inspection or on a regularly scheduled basis, whichever occurs first (see Facility Manager Guide). A Level III inspection provides the means to perform a more in-depth analysis to ascertain the condition of a system component. This inspection method may require the use of special tools and equipment, expertise beyond that of the typical inspector, or a significant amount to the time to accomplish such that it would disrupt the inspection schedule. The inspection may also be classified at this level due to life, health, or safety risks.

Level III inspections of the coal dump trestle structural components should be conducted by an engineer or team of engineers experienced in the design and construction of coal dump trestles and should include a thorough systematic evaluation of the condition triggering the Level III inspection and an assessment of the safety and stability of the structure.

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Depending on the assessment of the potential impact of observed conditions on the safety or stability of the coal dump trestle, advanced test and inspection methods may be required as part of the Level III inspection to determine the cause and/or extent of an observed defect.

II. GENERAL INSPECTION

A. Process

The inspection is normally conducted at the component level. Figure 25-A provides the breakdown from system through component for Coal Site Handling and Storage.

The inspector will work through the Work Breakdown Structure (WBS) to conduct the inspection. At the component level the inspector will be provided a list of defects, each of which is described further as observations. These observations are described to various levels of severity as they relate to the effect on the life of the system. The quantification of each deficiency is identified by the inspector using the associated unit of measure. Once an observation is populated with a deficient quantity, the inspector will be requested to provide information on component type and location. The installation date or age of the component may be reloaded into the WBS for each asset from the Real Property Inventory List or site specific information. This can be overridden by the inspector, Site CAIS Personnel, or Facility Manager.

B. Location

Level I and II inspection will be located by the inspector through a discrete entry into the data collection device. The Inspection Unit (IU) or component location will be derived from facility-supplied segment numbering lists, maps or other identification numbering systems. For building associated "IU's" and components, the facility shall furnish plans annotated with room number schedules. In the case of non-room associated components, plans will be oriented with the top of each sheet being the north direction, so as to allow directional location and description. In the case where no maps or plans are available, the inspector shall enter a brief (65 character) description of location.

III. INSPECTOR QUALIFICATIONS

Minimum inspector qualifications for Coal Site Handling and Storage require a five-year journeyman. Experience or familiarity in the areas of mechanical conveying equipment, railroads, or bridge-type structures is desirable but not required. All of the inspection requirements for this system can be accomplished by a single inspector, however safety and other considerations may require inspectors to work in teams. Inspectors will be specifically trained in the CAS system and its usage, and will be CAS certified.

IV. INSPECTION UNIT (IU)

The inspection unit (IU) is normally defined at the component level. If the unit of measure at the component level is "each", then the IU is "each" (e.g. Support Structure). If the unit of measure is "linear feet", the IU quantity is the total length of that component that exists at that location (e.g., 20 linear feet of track on the coal dump trestle).

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IUs may be only one occurrence of a component (e.g., a pulley) or multiple occurrences of a single component (e.g., multiple rollers occurring in a section of conveyor). Defect quantities are recorded by the inspector for each occurrence for each discrete component.

If the inspector has multiple defects that occur in the same conveyor length, the inspector will quantify the observation that is considered most severe and identify the remaining quantity under the less severe observation for the discrete component.

V. UNIT COSTS

The unit costs that are applied to the quantities recorded for each observation are contained within the Site CAIS as repair cost.

VI. STANDARD SAFETY REQUIREMENTS

The Master Safety Plan will be followed at all times during the inspections.

Prior to inspection of the Coal Site Handling and Storage facilities, the authority (Facility Manager) having jurisdiction shall be notified to secure proper access, safety briefings, and personal safety items.

While inspecting Coal Site Handling and Storage facility components:

- Use approved tag-out procedures to prevent inadvertent operation of rotating equipment during inspection activities. The equipment should be locked out at the main control panel when possible.
- Be aware of adjacent operating or rotating machinery. Do not defeat safety interlocks, machinery guards, or other automatic or passive safety devices.
- Confirm that all grounding/bonding connections are in place to prevent electrical sparking.
- Do not inspect electrical components in a wet environment while wearing wet clothing.
- Do not wear loose clothing (unbuttoned sleeves, ties, open jacket, etc.) during the inspection.

VII. STANDARD TOOLS

Employee Identification Card - to be worn or carried during all inspections
Data Collection Device (DCD)
Battery pack for DCD
Combination track level/gage
Explosion-proof flashlight
Tape Measure - 50 feet
Folding rule - 6 feet
Screwdrivers - flat head and Phillips head
Pliers
Knife
Wire brush
Hammer
Ice pick

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Non-skid shoes
Breathing mask (protection from coal dust
Goggles

VIII. SPECIAL TOOLS AND EQUIPMENT REQUIREMENTS

18 inch straightedge (end batter)
Calipers (head wear)

At the subsystem level, the deficiency standard has identified special tools and equipment required for the standard inspection of the associated components, which exceed the standard tools identified for the system. Level II Inspection Method and Level III Inspection Method Guide Sheets will address additional tools and equipment requirements that are specific to that particular method. Inspectors should review these sections in order to determine any special tool requirements for subsystems they are to inspect.

IX. LEVEL II INSPECTION METHOD KEYS

Certain observations will reference a Level II Inspection Method Guide Sheet. The Facility Manager will be able to identify deficiencies where a Level II is flagged. The Level II Key at the observation level will refer to a specific guide sheet. Typically, the inspector should perform Level II inspections as they occur in the field. However, the Facility Manager may choose to limit the inspection process solely to Level I inspections.

All Level II Guide Sheets are located at the end of each subsystem section. A Guide Sheet Reference Page precedes Level II and Level III Guide Sheets.

X. LEVEL III INSPECTION METHOD KEYS

Certain observations will reference a Level III Inspection Method Guide Sheet. The Facility Manager will be able to identify deficiencies where a Level III is flagged. The Level III Key at the observation level will refer to a specific guide sheet. These guide sheets, in many cases, will identify the first phase of non-standard testing. These inspections are typically not completed by the inspector. The Facility Manager will Schedule Level III inspections for execution based on the guidance provided by the frequency tables and Level I or II defects/observations.

All Level III Guide Sheets are located at the end of each subsystem section. A Guide Sheet Reference Page precedes Level II and Level III Guide Sheets.

XI. REPLACEMENT COST

A replacement cost for each subsystem component will be contained within the cost estimating system in the Site CAIS.

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XII. APPENDICES

Appendix A - Abbreviations

A summary and definition of all abbreviations used in this system are contained in Appendix A which is located at the end of Coal Site Handling and Storage.

Appendix B - Glossary

A glossary of terms used in this system are contained in Appendix B which is located at the end of Coal Site Handling and Storage.

Appendix C - Life Cycles

A listing of the average life cycle durations for each assembly* in the Standard.

Note - Facility Manager's Guide

The following are included in the Facility Manager's Guide:

A table showing the required manhours to perform the standard inspection for this facility listed by Cat Code (three digit).

A listing of all Level III inspections with their estimated cost and time to perform. This list will include frequency of inspection for time driven Level III's.

* Assembly is a term describing the level at which replacement rather than repair occurs. This can be at the subsystem or component designation, depending on the system being surveyed.

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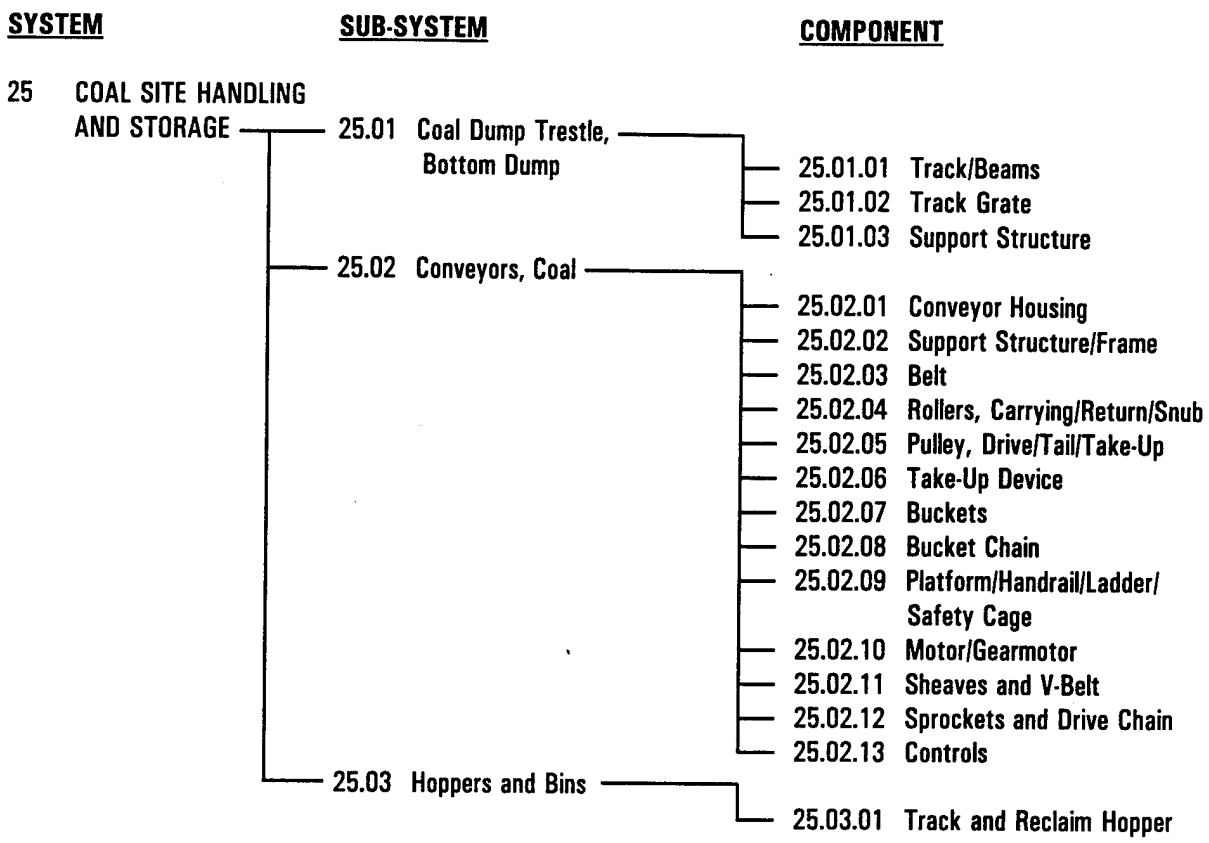
Figure 25-A. WORK BREAKDOWN STRUCTURE



25.01 COAL DUMP TRESTLE, BOTTOM DUMP

DESCRIPTION

Coal dump trestles are a sub-system of Coal Site Handling and Storage Systems. They are railroad trestles designed for unloading bulk coal from railroad cars. Coal dump trestles are usually designed to accommodate one or two bottom-unloading cars. The inspection unit is the sub-system.

SPECIAL TOOL AND EQUIPMENT REQUIREMENTS

No special tools are needed for the inspection of coal dump trestles beyond those listed in the Standard Equipment Requirements section of the introduction.

SPECIAL SAFETY REQUIREMENTS

Level I and Level II inspections are performed by walking the Coal Dump Trestle deck, and observing from ground level. The inspection must be performed with prior approval of the Facility Manager, who will notify the necessary authorities so as to provide traffic safety measures and access. It is suggested that the inspector wear an orange safety vest.

No other special safety requirements are needed for the inspection of the coal dump trestle, beyond the requirements listed in the Master Safety Plan and System Safety Section.

COMPONENT LIST

- 25.01.01 TRACK/BEAMS
- 25.01.02 TRACK GRATE
- 25.01.03 SUPPORT STRUCTURE

RELATED SUBSYSTEMS

Due to the related nature of the elements requiring inspection, the following systems and sub-systems should be reviewed for concurrent inspection.

01.01	FOUNDATION WALLS AND PIERS
20.01	TRACK

STANDARD INSPECTION PROCEDURE

Coal dump trestle inspection requires both Level I and Level II inspections as part of the basic inspection process. Additional Level II or Level III inspections may be indicated or "triggered" by Level I defect observations. Any additional Level II inspections should be accomplished by the inspector at the time of the Level I inspection. Associated defects and observations, for each major component of the coal dump trestle are listed in the inspector's Data Collection Device.

25.01 COAL DUMP TRESTLE, BOTTOM DUMP

COMPONENTS

◆ 25.01.01 TRACK/BEAMS

The track/beams of a coal dump trestle are the track rails on which the rail car rides and the structural beams that support the rails. The rails may be welded to the beams or may be attached with bolted clips. The beams may have cross bracing for structural strength and dimensional stability.

Defect:	UOM	LEVEL II KEY	LEVEL III KEY
*** Track Gage:**			
Observation:			
a. Gage greater than 57-1/2".	EA		1
***{Severity M}			
b. Gage greater than 57-3/4".	EA		1
***{Severity H}			
c. Gage less than 56" or greater than 58".	EA		1
***{Severity H}			
Defect:			
*** Cross Level:**			
Observation:			
a. Cross level deviations spirals greater than 1-1/2".	EA		
***{Severity M}			
b. Cross level deviations spirals greater than 1-3/4".	EA		
***{Severity H}			
c. Cross level deviations spirals greater than 2".	EA		
***{Severity H}			
Defect:			
*** Broken Rail:**			
Observation:			
a. Complete transverse separation of head, web, and base.	EA		
***{Severity H}			
b. Complete angular transverse separation of head, web, and base.	EA		
***{Severity H}			

25.01 COAL DUMP TRESTLE, BOTTOM DUMP

COMPONENTS (Continued)

◆ 25.01.01 TRACK/BEAMS (Continued)

Defect:	UOM	LEVEL II KEY	LEVEL III KEY
*** Broken Base:**			
Observation:			
a. Broken base less than 6 inches.	EA		
***{Severity M}			
b. Broken base 6 inches or greater.	EA		
***{Severity H}			
Defect:			
*** Corroded Base:**			
Observation:			
a. Corrosion 1/4 inch or less.	LF		
***{Severity L}			
b. Corrosion greater than 1/4 inch.	LF		
***{Severity M}			

25.01 COAL DUMP TRESTLE, BOTTOM DUMP

COMPONENTS (Continued)

◆ 25.01.01 TRACK/BEAMS (Continued)

Defect:	UOM	LEVEL II KEY	LEVEL III KEY
* **Physical Damage to Rail:**			
Observation:			
a. Flaking.	LF		
***{Severity L}			
b. Surface depth 1/4 inch or less.	EA		
***{Severity L}			
c. Shelling on gage side of rail.	LF		
***{Severity L}			
d. End batter 1/4 inch or less.	EA		2
***{Severity L }			
e. End batter greater than 1/4 inch.	EA		2
***{Severity M}			
f. Crushed head.	EA		
***{Severity M}			
g. Torch cut rail ends.	EA		
***{Severity M}			
h. Gage wear 1/2" or less on rail 90 pounds or larger.	LF		3
***{Severity M}			
i. Gage wear 3/8" or less on rail less than 90 pounds.	LF		3
***{Severity M}			
j. Head wear 1/2" or less on rail 90 pounds or larger.	LF		3
***{Severity M}			
k. Head wear 3/8" or less on rail less than 90 pounds.	LF		3
***{Severity M}			
l. Gage wear greater than 1/2" on rail 90 pounds or larger.	LF		3
***{Severity H}			
m. Gage wear greater than 3/8" on rail less than 90 pounds.	LF		3
***{Severity H}			
n. Head wear greater than 1/2" on rail 90 pound or larger.	LF		3
***{Severity H}			
o. Head wear greater than 3/8" on rail less than 90 pounds.	LF		3
***{Severity H}			

25.01 COAL DUMP TRESTLE, BOTTOM DUMP

COMPONENTS (Continued)

◆ 25.01.01 TRACK/BEAMS (Continued)

Defect:	UOM	LEVEL II KEY	LEVEL III KEY
* **Beam Corrosion - Top and Bottom Flange:**			
Observation:			
a. Surface rust no pitting evident.	LF		
***{Severity L}			
b. Corrosion evident pitting and blistering of base material.	LF		
***{Severity M}			
c. Corrosion evident with loss to base section	LF		4
***{Severity H}			
Defect:			
* **Beam Corrosion - Web Plate:**			
Observation:			
a. Surface rust no pitting evident.	SF		
***{Severity L}			
b. Corrosion evident pitting and blistering of base material.	SF		
***{Severity M}			
c. Corrosion evident with loss to base section	SF		4
***{Severity H}			
Defect:			
* **Physical Damage to Beam:**			
Observation:			
a. Hairline or greater crack, fillet of top flange	LF		4
***{Severity H}			
b. Hairline or greater crack, fillet of bott. flange	LF		4
***{Severity H}			
c. Hairline or greater vertical crack, in web of beam	LF		4
***{Severity H}			
d. Hairline or greater crack, at toe of weld or adjacent metal	LF		4
***{Severity H}			
e. Beam is out of alignment.	LF		4
***{Severity H}			

25.01 COAL DUMP TRESTLE, BOTTOM DUMP

COMPONENTS (Continued)

◆ 25.01.01 TRACK/BEAMS (Continued)

Defect:	UOM	LEVEL II KEY	LEVEL III KEY
*** Straightness or Buckling of Beam:**			
Observation:			
a. Sign of wrinkles in web and or stiffener plate at support.	LF		
***{Severity M}			
b. Sign of wrinkles in flange	LF		
***{Severity M}			
c. Sign of buckling in web and or stiffener plate at support	LF		4
***{Severity H}			
d. Sign of buckling in flange	LF		4
***{Severity H}			
Defect:			
***Rail Clip:**			
Observation:			
a. Surface corrosion (no pitting evident).	SF		
***{Severity L}			
b. Corrosion evidenced by pitting or blistering.	SF		
***{Severity M}			
c. Loose bolts.	EA		
***{Severity M}			
d. Corrosion evidenced by holes or loss of base metal.	SF		
***{Severity H}			
e. Broken or missing nuts or bolts.	EA		
***{Severity H}			
f. Cracked or broken clip.	EA		
***{Severity H}			
g. Clip is missing.	EA		
***{Severity H}			

25.01 COAL DUMP TRESTLE, BOTTOM DUMP

COMPONENTS (Continued)

◆ 25.01.02 TRACK GRATE

The track grate is a rectangular frame with crisscrossing bars. The bars are spaced to easily pass pieces of coal of the largest expected size but to prevent larger objects and people from falling through the grate. Track grates are usually fabricated of welded or bolted steel shapes.

Defect:	UOM	LEVEL II KEY	LEVEL III KEY
* **Wear:**			
Observation:			
a. Minor wear to the bars.	SF		
***{Severity L}			
b. Noticeable wear to the bars - surface slippery.	SF		
***{Severity L}			
Defect:			
* **Connections:**			
Observation:			
a. Loose bolts or fasteners	EA		
***{Severity M}			
b. Broken or missing bolts, rivets or welds.	EA		
***{Severity H}			
Defect:			
* **Corrosion:**			
Observation:			
a. Surface rust no pitting evident.	SF		
***{Severity L }			
b. Corrosion evident pitting and blistering of base material.	SF		
***{Severity M}			
c. Corrosion evident with loss to base section.	SF		
***{Severity H}			
Defect:			
* **Physical Damage:**			
Observation:			
a. Out of alignment or damaged member	EA		
***{Severity M}			
b. Broken or missing member	EA		
***{Severity H}			

25.01 COAL DUMP TRESTLE, BOTTOM DUMP

COMPONENTS (Continued)

◆ 25.01.03 SUPPORT STRUCTURE

The support structure for the track and grate support beams will consist of a structural steel frame work or concrete foundation walls or abutments.

Defect:	UOM	LEVEL II KEY	LEVEL III KEY
* **Corrosion - Top and Bottom Flange:**			
Observation:			
a. Surface rust no pitting evident.	LF		
***{Severity L}			
b. Corrosion evident pitting and blistering of base material.	LF		
***{Severity M}			
c. Corrosion evident with loss to base section.	LF		5
***{Severity H}			
Defect:			
* **Corrosion - Web Plate:**			
Observation:			
a. Surface rust no pitting evident.	SF		
***{Severity L}			
b. Corrosion evident pitting and blistering of base material.	SF		
***{Severity M}			
c. Corrosion evident with loss to base section.	SF		5
***{Severity H}			

25.01 COAL DUMP TRESTLE, BOTTOM DUMP

COMPONENTS (Continued)

◆ 25.01.03 SUPPORT STRUCTURE (Continued)

Defect:	UOM	LEVEL II KEY	LEVEL III KEY
*** Cracks:**			
Observation:			
a. Hairline or greater crack, fillet of top flange	LF		5
***{Severity H}			
b. Hairline or greater crack, fillet of bottom flange	LF		5
***{Severity H}			
c. Hairline or greater vertical crack, in web of beam	LF		5
***{Severity H}			
d. Hairline or greater crack, at toe of weld or adjacent metal	LF		5
***{Severity H}			
Defect:			
*** Straightness or Buckling:**			
Observation:			
a. Sign of wrinkles in web and or stiffener plate at support.	LF		
***{Severity M}			
b. Sign of wrinkles in flange	LF		
***{Severity M}			
c. Sign of buckling in web and or stiffener plate at support	LF		5
***{Severity H}			
d. Sign of buckling in flange	LF		5
***{Severity H}			
Defect:			
*** Vehicular Damage:**			
Observation:			
a. Primary out of alignment	LF		9
***{Severity H}			
b. Secondary member out-of alignment	LF		9
***{Severity H}			

25.01 COAL DUMP TRESTLE, BOTTOM DUMP

COMPONENTS (Continued)

◆ 25.01.03 SUPPORT STRUCTURE (Continued)

Defect:	UOM	LEVEL II KEY	LEVEL III KEY
*** Corrosion - Gussets or Connection Plates:**			
Observation:			
a. Surface rust no pitting evident.	SF		
***{Severity L}			
b. Corrosion evident pitting and blistering of base material.	SF		6
***{Severity M}			
c. Corrosion evident with loss to base section	SF		6
***{Severity H}			
Defect:			
*** Corrosion - Bolts or Welds:**			
Observation:			
a. Surface rust no pitting evident.	EA		
***{Severity L}			
b. Corrosion evident pitting and blistering of base material.	EA		
***{Severity M}			
c. Corrosion evident with loss to base section.	EA		6
***{Severity H}			
Defect:			
*** Connectors or Fasteners:**			
Observation:			
a. Loose bolts or fasteners	EA		
***{Severity L}			
b. Missing fasteners or connectors	EA		
***{Severity H}			
c. Crack in weld.	LF		6
***{Severity H}			
d. Crack in connection plate	LF		6
***{Severity H}			

25.01 COAL DUMP TRESTLE, BOTTOM DUMP

COMPONENTS (Continued)

◆ 25.01.03 SUPPORT STRUCTURE (Continued)

Defect:	UOM	LEVEL II KEY	LEVEL III KEY
*** Trestle Bearing - Expansion or Fixed Bearing (Metal):**			
Observation:			
a. Surface rust no evidence of pitting, expansion bearing free to rotate.	EA		
***{Severity L}			
b. Dirt and debris accumulated around base of bearing	SF		
***{Severity L}			
c. Corrosion pitting and blistering of base metal, expansion bearing free to rotate	EA		
***{Severity M}			
d. Corrosion with loss to base section, expansion bearing frozen	EA		7
***{Severity H}			
e. Excess rotation of expansion bearing	EA		7
***{Severity H}			

Defect:	UOM	LEVEL II KEY	LEVEL III KEY
*** Trestle Elastomeric Bearing:**			
Observation:			
a. Bulging of the bearing.	EA		10
***{Severity M}			
b. Splitting or tearing of the bearing, including interior steel shims bond.	EA		10
***{Severity M}			
c. Bond to the sole and or masonry plate failed.	EA		10
***{Severity H}			
d. Excess longitudinal movement	EA		7
***{Severity H}			
e. Excess rotation movement	EA		7
***{Severity H}			

25.01 COAL DUMP TRESTLE, BOTTOM DUMP

COMPONENTS (Continued)

◆ 25.01.03 SUPPORT STRUCTURE (Continued)

Defect:	UOM	LEVEL II KEY	LEVEL III KEY
*** Corrosion - Bearing Sole:**			
Observation:			
a. Surface rust no pitting evident.	SF		
***{Severity L}			
b. Corrosion evident pitting and blistering of base material.	SF		
***{Severity M}			
c. Corrosion evident with loss to base section	SF		7
***{Severity H}			
Defect:			
*** Bearing Plate Anchor Bolts:**			
Observation:			
a. Loose anchor bolts or bearing	EA		
***{Severity L}			
b. Surface rust no pitting evident.	EA		
***{Severity L}			
c. Corrosion evident pitting and blistering of base material.	EA		
***{Severity M}			
d. Corrosion evident with loss to base section	EA		7
***{Severity H}			
e. Missing or broken anchor bolts.	EA		
***{Severity H}			
Defect:			
*** Abutment/Drains or Weep Holes:**			
Observation:			
a. Drain or weep hole clogged.	EA		
***{Severity L}			
b. Signs of water stain on the face of abutment around cracks.	LF		
***{Severity M}			
c. Visible signs of water seeping through cracks or joints in the abutment.	LF		
***{Severity H}			

25.01 COAL DUMP TRESTLE, BOTTOM DUMP

COMPONENTS (Continued)

◆ 25.01.03 SUPPORT STRUCTURE (Continued)

Defect:	UOM	LEVEL II KEY	LEVEL III KEY
*** Erosion or Scouring at Abutment or Wingwalls:**			
Observation:			
a. Voids less than 2".	SF		
***{Severity L}			
b. Voids greater than 2" less than 6".	SF		
***{Severity H}			
c. Undermining of abutment, with voids greater than 6".	SF		8
***{Severity H}			
Defect:			
*** Horizontal Cracks:**			
Observation:			
a. Hairline cracks less than 1/32" wide.	LF		
***{Severity L}			
b. Medium crack greater than 1/32" less than 1/16" wide. Staining of concrete surface with signs of efflorescence deposit and spalling of cracks.	LF		8
***{Severity M}			
c. Wide cracks greater than 1/16" wide. Staining of concrete surface with efflorescence deposit and spalling of cracks, reinforcing bars exposed	LF		8
***{Severity H}			
Defect:			
*** Diagonal Cracks - Abutments:**			
Observation:			
a. Hairline cracks less than 1/32" wide.	LF		
***{Severity L}			
b. Medium crack greater than 1/32" less than 1/16" wide with spalling along each side of cracks.	LF	1	
***{Severity M}			
c. Wide cracks greater than 1/16" wide with spalling each side of cracks.	LF		8
***{Severity H}			

25.01 COAL DUMP TRESTLE, BOTTOM DUMP

COMPONENTS (Continued)

◆ 25.01.03 SUPPORT STRUCTURE (Continued)

Defect:	UOM	LEVEL II KEY	LEVEL III KEY
*** Vertical Cracks - Abutments/Wingwalls:**			
Observation:			
a. Hairline cracks less than 1/32" wide.	LF		
***{Severity L}			
b. Medium crack greater than 1/32" less than 1/16" wide. Staining of concrete surface with signs of efflorescence deposit and spalling of cracks.	LF	1	
***{Severity M}			
c. Wide cracks greater than 1/16" wide. Staining of concrete surface with efflorescence deposit and spalling of cracks, reinforcing bars exposed.	LF		8
***{Severity H}			
Defect:			
*** Joints: Abutments and Wingwalls:**			
Observation:			
a. Joint separation or movement less than 1/16".	LF		
***{Severity L}			
b. Joint separation or movement greater 1/16" less than 1/4".	LF		
***{Severity M}			
c. Joint separation or movement greater than 1/4".	LF		8
***{Severity H}			
Defect:			
*** Scaling - Abutments and Wingwalls:**			
Observation:			
a. Loss of surface mortar greater than 1/4" deep and less than 1/2" deep with exposed aggregate.	SF		
***{Severity L}			

25.01 COAL DUMP TRESTLE, BOTTOM DUMP

COMPONENTS (Continued)

◆ 25.01.03 SUPPORT STRUCTURE (Continued)

Defect:	UOM	LEVEL II KEY	LEVEL III KEY
*** Scaling - Abutments and Wingwalls: (Continued)**			
b. Loss of surface mortar greater than 1/2" deep, less than 1" deep. Coarse aggregates are clearly exposed.	SF		
***{Severity M}			
c. Loss of coarse aggregate particles, as well as mortar surrounding coarse aggregates; depth of the loss greater than 1" deep, reinforcing bars exposed.	SF		8
***{Severity H}			
Defect:			
*** Rotational Movement:** Some abutments are constructed with a battered or slope front face.			
Observation:			
a. Abutment walls rotated inward or outward.	LF		8
***{Severity H}			
b. Wing walls rotated inward or outward.	LF		8
***{Severity H}			
Defect:			
*** Bearing Seat - Abutment Wall:** (Critical where beam bears directly on the Abutment wall.)			
Observation:			
a. Light spalling and chipping of concrete.	SF		
***{Severity L}			
b. Dirt and debris accumulated on bearing seat.	SF		
***{Severity L}			
c. Spalling, cracking of concrete at edge of seat.	SF		
***{Severity M}			

25.01 COAL DUMP TRESTLE, BOTTOM DUMP

COMPONENTS (Continued)

◆ 25.01.03 SUPPORT STRUCTURE (Continued)

Defect:	UOM	LEVEL II KEY	LEVEL III KEY
*** Bearing Seat - Abutment Wall: (Continued)** (Critical where beam bears directly on the Abutment wall.)			
d. Severe spalling and cracking with crushing of concrete and exposed reinforcing bars. ***{Severity H}	SF		8
Defect:			
*** Physical Damage of Abutments and Wingwalls:** Observation:			
a. Member out-of-alignment. ***{Severity H}	SF		8
b. Member cracked, crushed or missing. ***{Severity H}	SF		8
Defect:			
*** Concrete Spalling - Abutments and Wingwalls:** Observation:			
a. Depression less than 1" deep and less than 6" in diameter. ***{Severity L}	EA		
b. Depression greater than 1" deep and greater than 6" in diameter. ***{Severity M}	SF	1	
c. Depression greater than 1" deep and greater than 6" in diameter with corroded re-bars. ***{Severity H}	SF		8

25.01 COAL DUMP TRESTLE, BOTTOM DUMP

COMPONENTS (Continued)

◆ 25.01.03 SUPPORT STRUCTURE (Continued)

Defect:	UOM	LEVEL II KEY	LEVEL III KEY
*** Concrete Popout - Abutments and Wingwalls:**			
Observation:			
a. Conical shape holes less than 1/2 inch diameter.	EA		
***{Severity L}			
b. Conical shape hole greater than 1/2 inch less than 2 1/2 inch diameter.	EA		
***{Severity M}			
c. Conical shape hole greater than 2-1/2 inch in diameter.	EA		
***{Severity M}			

25.01 COAL DUMP TRESTLE, BOTTOM DUMP

REFERENCES

1. US Department of Transportation, Federal Highway Administration, Bureau of Public Roads (DOT) Bridge Inspector's Training Manual, 1990 Edition

2. Bridge Inspection and Rehabilitation, Parsons Brinkerhoff, Edited by L. G. Silano, PE, 1993

3. NAVFAC MO-126 Inspection of Bridges and Trestles

4. Technical Manual Army TM 5-628: Air Force AFR 91-44 Railroad Track Standards

5. American Railway Engineering Association (AREA), Manual for Railway Engineering

6. Code of Federal Regulations, Title 49, Part 213, Track Safety Standards

7. R.S. Means Cost Estimating Data, 1994

25.01 COAL DUMP TRESTLE, BOTTOM DUMP

LEVEL II KEY	GUIDE SHEET CONTROL NUMBER
1	GS-II 25.01.03-1

LEVEL III KEY	GUIDE SHEET CONTROL NUMBER
1	GS-III 25.01.01-1
2	GS-III 25.01.01-2
3	GS-III 25.01.01-3
4	GS-III 25.01.01-4
5	GS-III 25.01.03-5
6	GS-III 25.01.03-6
7	GS-III 25.01.03-7
8	GS-III 25.01.03-8
9	GS-III 25.01.03-9
10	GS-III 25.01.03-10

LEVEL II INSPECTION METHOD GUIDE SHEET

LEVEL II GUIDE SHEET - KEY NO. 1

COMPONENT: SUPPORT STRUCTURE
CONTROL NUMBER: GS-II 25.01.03-1

Application

This applies to the investigation of concrete deterioration to primary and secondary members due to spalling from delamination.

The results of the Level II inspection can be used to trigger a Level III inspection or necessary repair.

Special Safety Requirements

No special safety requirements, beyond the requirements listed in the Safety Section, are to be observed in the performance of the Level II.

Inspection Actions

1. Clean loose concrete from area to be inspected
2. Measure the affected area.
3. Tap the affected area with a hammer to determine extent of unsound or hollow concrete.

Recommended Inspection Frequency

As triggered by Level I defect/observation, and where this Level II inspection is the standard inspection procedure.

References

1. US Department of Transportation, Federal Highway Administration, Bureau of Public Roads (DOT) Bridge Inspector's Training Manual, 1990 Edition
2. Bridge Inspection and Rehabilitation, Parsons Brinkerhoff edited by L.G. Silano, PE, 1993
3. NAVFAC MO-126, Inspection of Bridges and Trestles

LEVEL III INSPECTION METHOD GUIDE SHEET

LEVEL III GUIDE SHEET - KEY NO. 1

COMPONENT: TRACK/BEAMS
CONTROL NUMBER: GS-III 25.01.01-1

Application

This guide applies to measurement of the gage of tangent track, and coal dump trestles.

Special Safety Requirements

No special safety requirements are needed for the performance of the Level III inspection beyond those required in the Master Safety Plan and System Safety Section.

Inspection Actions

During inspection track gage shall be checked at each end and in the center of the coal dump trestle as a minimum and shall be checked when visual inspection indicates that the gage has changed. Measurements require one person with a combination level/ gage.

1. Tangent track gage is measured at right angle to the gage line.

Special Tools and Equipment

The following is a list of special tools and equipment beyond those listed in the Standard Tool Section:

1. Combination level/gage

Recommended Inspection Frequency

Do a Level III inspection when triggered by a Level I inspection.

References

1. Technical Manual Army TM 5-628: Air Force AFR 91-44 Railroad Track Standards
2. American Railway Engineering Association (AREA), Manual for Railway Engineering
3. Code of Federal Regulations, Title 49, Part 213, Track Safety Standards

LEVEL III INSPECTION METHOD GUIDE SHEET

LEVEL III GUIDE SHEET - KEY NO. 2

COMPONENT: TRACK/BEAMS
CONTROL NUMBER: GS-III 25.01.01-2

Application

This guide applies to the measurement of rail batter at the end of a rail.

Special Safety Requirements

No special safety requirements are needed for the performance of the Level III inspection beyond those required in the Master Safety Plan and System Safety Section.

Inspection Actions

Rails observed as being battered at the rail end shall be measured to determine the extent of the rail batter. Requires one person with an eighteen-inch straight edge and a rule or taper gage to measure the rail batter.

1. An eighteen inch straight edge is placed on the top of the batter rail end, with one end of the straight edge opposite and flush to the end of the rail.

2. End batter is the distance between the straight edge and the top of the rail measured at a point 1/2-inch from the end of the rail.

Special Tools and Equipment

The following is a list of special tools and equipment beyond those listed in the Standard Tool Section:

1. Eighteen-inch straight edge

Recommended Inspection Frequency

Do a Level III inspection only when triggered by a Level I inspection.

References

1. Technical Manual Army TM 5-628: Air Force AFR 91-44 Railroad Track Standards

2. American Railway Engineering Association (AREA), Manual for Railway Engineering

3. Code of Federal Regulations, Title 49, Part 213, Track Safety Standards

LEVEL III INSPECTION METHOD GUIDE SHEET

LEVEL III GUIDE SHEET - KEY NO. 3

COMPONENT TRACK/BEAMS
CONTROL NUMBER: GS-III 25.01.01-3

Application

This guide applies to the measurements of head wear of a rail.

Special Safety Requirements

No special safety requirements are needed for the performance of the Level III inspection beyond those required in the Master Safety Plan and System Safety Section.

Inspection Actions

On rail suspected of being worn more than the allowance provided; wear measurements shall be taken at the center and at each end of the rail not more than one foot from the end of the of the joint bar. Requires one person with an outside caliper to measure rail wear.

1. Vertical, top head, wear shall be measured at the center line of the web of the rail using calipers. These measurements are to be compared to the pattern rail height dimensions for the rail section being measured.

2. Horizontal, side head, wear shall be measured at the gage line of the rail head using calipers. These measurements are to be compared to the rail pattern head dimensions for the rail section being measured.

Special Tools and Equipment

The following is a list of special tools and equipment beyond those listed in the Standard Tool Section:

1. Outside calipers

Recommended Inspection Frequency

Do a Level III inspection when triggered by a Level I inspection.

References

1. Technical Manual Army TM 5-628: Air Force AFR 91-44 Railroad Track Standards

2. American Railway Engineering Association (AREA), Manual for Railway Engineering

3. Code of Federal Regulations, Title 49, Part 213, Track Safety Standards

LEVEL III INSPECTION METHOD GUIDE SHEET

LEVEL III GUIDE SHEET - KEY NO. 4

COMPONENT: TRACK/BEAMS
CONTROL NUMBER: GS-III 25.01.01-4

Application

This guide has been prepared to identify the purpose of a Level III inspection and its more sophisticated test and inspection methods which may be appropriate to determine the cause and/or extent of defects recorded in Level I or Level II defect observations at the steel primary and secondary members.

Whereas the purpose of the Level I inspection was to record the observable defects at the primary and secondary members, this Level III inspection is performed to provide a thorough systematic evaluation of the observed defect and to make an assessment of its effects, if left unchecked, on the safety, durability and stability of the primary and secondary member and its appurtenant works.

The Level III inspection should be performed when prompted by the results of a Level I or II inspection. The inspection should be performed by an engineer or multidisciplined team of engineers experienced in the design and construction of coal dump trestles or similar structures.

The results of the Level III inspection will be used to develop maintenance or remedial measure work strategy that will correct the existing deficiency conditions or to require continued monitoring of existing deficiency conditions on the primary and secondary members.

In general, appropriate advanced inspection methods will be identified, recommended, and performed by or under the supervision of the inspection engineer personnel as part of the Level III test and inspection method. Advanced inspection methods will be assigned only after the assessment of defect conditions observed during a Level I or II inspection.

Special Safety Equipment

Special safety equipment needed for the Level III inspection of the primary and secondary members are listed in the standards developed for the Standard Inspection of the coal dump trestle.

Special Safety Requirements

Special safety requirements are as set forth in the standards developed for the Standard Inspection of the coal dump trestle.

LEVEL III INSPECTION METHOD GUIDE SHEET

LEVEL III GUIDE SHEET - KEY NO. 4 (Continued)

COMPONENT: TRACK/BEAMS
CONTROL NUMBER: GS-III 25.01.01-4

Inspection Action

1. Prior to making a field inspection of the observed defect, review all past records concerning the primary and secondary members and the defective component if available. These records may include pre-construction investigation records, design criteria and analysis records, available construction records, previous periodic maintenance inspection records, water level records, and photographs taken during initial construction and subsequent inspections.

2. Perform inspection of the pertinent components where observed defects that triggered a Level III inspection are listed.

3. Make an assessment of the importance of individual defects observed for a given component at the dump trestle site. Indicate priorities for any required maintenance, or remedial measure work.

4. Identify whether particular observed defects need additional or continued observation.

5. Assess the stability and safety of the structure.

6. Prepare final cost estimate for advanced inspection methods required to determine the cause and extent of the observed defect.

7. Prepare cost estimate for required maintenance or remedial repair measures, as applicable.

Level III advanced inspection methods may be required for specific Level I and Level II defect conditions observed at a coal dump trestle site. Level III advanced test or inspection methods and associated observed defects for primary and secondary members include, but are not limited to the following:

LEVEL III INSPECTION METHOD GUIDE SHEET

LEVEL III GUIDE SHEET - KEY NO. 4 (Continued)

COMPONENT: TRACK/BEAMS
CONTROL NUMBER: GS-III 25.01.01-4

Advanced Test or Inspection Method		Applicable Observed Defects
1.	Grinding and or sandblasting, using corrosion of steel and section loss caliper to measure section loss	
2.	Magnetic particle	cracks in steel or welds
3.	Dye-Penetrant	cracks in steel or welds
4.	Ultrasonic test	cracks and voids in steel

Special Instructions

Review as-built and design drawings of structure.

Special Tools & Equipment Requirements

Grinder or sandblasting equipment
Surveying equipment
Industry required testing equipment needed to perform the advanced investigation method chosen

Recommended Inspection Frequency

As triggered by Level I and II defect/observations or every 3 years.

References

1. U.S. Department of Transportation, Federal Highway Administration, Bureau of Public Roads (DOT) Bridge Inspector's Training Manual, 1990 Edition

2. Bridge Inspection and Rehabilitation, Parsons Brinkerhoff Edited by L.G. Silano, PE, 1993

3. Inspection of Bridges and Trestles NAVFAC MO-126, October 1991

LEVEL III INSPECTION METHOD GUIDE SHEET

LEVEL III GUIDE SHEET - KEY NO. 5

COMPONENT: SUPPORT STRUCTURE
CONTROL NUMBER: GS-III 25.01.03-5

Application

This guide has been prepared to identify the purpose of a Level III inspection and its more sophisticated test and inspection methods which may be appropriate to determine the cause and/or extent of defects recorded in Level I or Level II defect observations at the steel primary and secondary members.

Whereas the purpose of the Level I inspection was to record the observable defects at the primary and secondary members, this Level III inspection is performed to provide a thorough systematic evaluation of the observed defect and to make an assessment of its effects, if left unchecked, on the safety, durability and stability of the primary and secondary member and its appurtenant works.

The Level III inspection should be performed when prompted by the results of a Level I or II inspection. The inspection should be performed by an engineer or multidisciplined team of engineers experienced in the design and construction of coal dump trestles or similar structures.

The results of the Level III inspection will be used to develop maintenance or remedial measure work strategy that will correct the existing deficiency conditions or to require continued monitoring of existing deficiency conditions on the primary and secondary members.

In general, appropriate advanced inspection methods will be identified, recommended, and performed by or under the supervision of the inspection engineer personnel as part of the Level III test and inspection method. Advanced inspection methods will be assigned only after the assessment of defect conditions observed during a Level I or II inspection.

Special Safety Equipment

Special safety equipment needed for the Level III inspection of the primary and secondary members are listed in the standards developed for the Standard Inspection of the coal dump trestle.

Special Safety Requirements

Special safety requirements are as set forth in the standards developed for the Standard Inspection of the coal dump trestle.

LEVEL III INSPECTION METHOD GUIDE SHEET

LEVEL III GUIDE SHEET - KEY NO. 5 (Continued)

COMPONENT: SUPPORT STRUCTURES
CONTROL NUMBER: GS-III 25.01.03-5

Inspection Action

1. Prior to making a field inspection of the observed defect, review all past records concerning the primary and secondary members and the defective component if available. These records may include pre-construction investigation records, design criteria and analysis records, available construction records, previous periodic maintenance inspection records, water level records, and photographs taken during initial construction and subsequent inspections.

2. Perform inspection of the pertinent components where observed defects that triggered a Level III inspection are listed.

3. Make an assessment of the importance of individual defects observed for a given component at the dump trestle site. Indicate priorities for any required maintenance, or remedial measure work.

4. Identify whether particular observed defects need additional or continued observation.

5. Assess the stability and safety of the structure.

6. Prepare final cost estimate for advanced inspection methods required to determine the cause and extent of the observed defect.

7. Prepare cost estimate for required maintenance or remedial repair measures, as applicable.

Level III advanced inspection methods may be required for specific Level I and Level II defect conditions observed at a coal dump trestle site. Level III advanced test or inspection methods and associated observed defects for primary and secondary members include, but are not limited to the following:

LEVEL III INSPECTION METHOD GUIDE SHEET

LEVEL III GUIDE SHEET - KEY NO. 5 (Continued)

COMPONENT: SUPPORT STRUCTURE
CONTROL NUMBER: GS-III 25.01.03-5

Advanced Test or Inspection Method		Applicable Observed Defects
1.	Grinding and or sandblasting, using corrosion of steel and section loss caliper to measure section loss	
2.	Magnetic particle	cracks in steel or welds
3.	Dye-Penetrant	cracks in steel or welds
4.	Ultrasonic test	cracks and voids in steel

Special Instructions

Review as-built and design drawings of structure.

Special Tools & Equipment Requirements

Grinder or sandblasting equipment
Surveying equipment
Industry required testing equipment needed to perform the advanced investigation method chosen

Recommended Inspection Frequency

As triggered by Level I and II defect/observations or every 3 years.

References

1. U.S. Department of Transportation, Federal Highway Administration, Bureau of Public Roads (DOT) Bridge Inspector's Training Manual, 1990 Edition

2. Bridge Inspection and Rehabilitation, Parsons Brinkerhoff Edited by L.G. Silano, PE, 1993

3. Inspection of Bridges and Trestles NAVFAC MO-126, October 1991

LEVEL III INSPECTION METHOD GUIDE SHEET

LEVEL III GUIDE SHEET - KEY NO. 6

COMPONENT: SUPPORT STRUCTURE
CONTROL NUMBER: GS-III 25.01.03-6

Application

This guide has been prepared to identify the purpose of a Level III inspection and its more sophisticated test and inspection methods which may be appropriate to determine the cause and/or extent of defects recorded in Level I or Level II defect observations of the connection.

Whereas the purpose of the Level I inspection was to record the observable defects at the connections, this Level III inspection is performed to provide a thorough systematic evaluation of the observed defect and to make an assessment of its effects, if left unchecked, on the safety, durability and stability of the structure and its appurtenant works.

The Level III inspection should be performed when prompted by the results of a Level I or II inspection. The inspection should be performed by an engineer or multidisciplined team of engineers experienced in the design and construction of coal dump trestles or similar structures.

The results of the Level III inspection will be used to develop maintenance or remedial measure work strategy that will correct the existing deficiency conditions or to require continued monitoring of existing deficiency conditions on the coal dump trestle.

In general, appropriate advanced inspection methods will be identified, recommended, and performed by or under the supervision of the inspection engineer personnel as part of the Level III test and inspection method. Advanced inspection methods will be assigned only after the assessment of defect conditions observed during a Level I or II inspection.

Special Safety Equipment

Special safety equipment needed for the Level III inspection of the primary and secondary members are listed in the standards developed for the Standard Inspection of the coal dump trestle.

Special Safety Requirements

Special safety requirements are as set forth in the standards developed for the Standard Inspection of the coal dump trestle.

LEVEL III INSPECTION METHOD GUIDE SHEET

LEVEL III GUIDE SHEET - KEY NO. 6 (Continued)

COMPONENT: SUPPORT STRUCTURES
CONTROL NUMBER: GS-III 25.01.03-6

Inspection Action

1. Prior to making a field inspection of the observed defect, review all past records concerning the primary and secondary members and the defective component if available. These records may include pre-construction investigation records, design criteria and analysis records, available construction records, previous periodic maintenance inspection records, water level records, and photographs taken during initial construction and subsequent inspections.

2. Perform inspection of the pertinent components where observed defects that triggered a Level III inspection are listed.

3. Make an assessment of the importance of individual defects observed for a given component at the dump trestle site. Indicate priorities for any required maintenance, or remedial measure work.

4. Identify whether particular observed defects need additional or continued observation.

5. Assess the stability and safety of the connections

6. Prepare final cost estimate for advanced inspection methods required to determine the cause and extent of the observed defect.

7. Prepare cost estimate for required maintenance or remedial repair measures, as applicable.

Level III advanced inspection methods may be required for specific Level I and Level II defect conditions observed at a coal dump trestle site. Level III advanced test or inspection methods and associated observed defects for trestle connections include, but are not limited to the following:

LEVEL III INSPECTION METHOD GUIDE SHEET

LEVEL III GUIDE SHEET - KEY NO. 6 (Continued)

COMPONENT: SUPPORT STRUCTURE
CONTROL NUMBER: GS-III 25.01.03-6

Advanced Test or Inspection Method		Applicable Observed Defects
1.	Grinding and or sandblasting, using caliper to measure section loss	corrosion of steel and section loss
2.	Magnetic particle	cracks in steel or welds
3.	Dye-Penetrant	cracks in steel or welds
4.	Ultrasonic test	cracks and voids in steel

Special Instructions

Review as-built and design drawings of structure.

Special Tools & Equipment Requirements

Grinder or sandblasting equipment
Surveying equipment
Industry required testing equipment needed to perform the advanced investigation method chosen

Recommended Inspection Frequency

As triggered by Level I and II defect/observations or every 3 years.

References

1. U.S. Department of Transportation, Federal Highway Administration, Bureau of Public Roads (DOT) Bridge Inspector's Training Manual, 1990 Edition

2. Bridge Inspection and Rehabilitation, Parsons Brinkerhoff Edited by L.G. Silano, PE, 1993

3. Inspection of Bridges and Trestles NAVFAC MO-126, October 1991

LEVEL III INSPECTION METHOD GUIDE SHEET

LEVEL III GUIDE SHEET - KEY NO. 7

COMPONENT: SUPPORT STRUCTURE
CONTROL NUMBER: GS-III 25.01.03-7

Application

This guide has been prepared to identify the purpose of a Level III inspection and its more sophisticated test and inspection methods which may be appropriate to determine the cause and/or extent of defects recorded in Level I or Level II defect observations of the bearing.

Whereas the purpose of the Level I inspection was to record the observable defects at the bearing, this Level III inspection is performed to provide a thorough systematic evaluation of the observed defect and to make an assessment of its effects, if left unchecked, on the safety, durability and stability of the structure and its appurtenant works.

The Level III inspection should be performed when prompted by the results of a Level I or II inspection. The inspection should be performed by an engineer or multidisciplined team of engineers experienced in the design and construction of coal dump trestles or similar structures.

The results of the Level III inspection will be used to develop maintenance or remedial measure work strategy that will correct the existing deficiency conditions or to require continued monitoring of existing deficiency conditions on the coal dump trestle.

In general, appropriate advanced inspection methods will be identified, recommended, and performed by or under the supervision of the inspection engineer personnel as part of the Level III test and inspection method. Advanced inspection methods will be assigned only after the assessment of defect conditions observed during a Level I or II inspection.

Special Safety Equipment

Special safety equipment needed for the Level III inspection of the primary and secondary members are listed in the standards developed for the Standard Inspection of the coal dump trestle.

Special Safety Requirements

Special safety requirements are as set forth in the standards developed for the Standard Inspection of the coal dump trestle.

LEVEL III INSPECTION METHOD GUIDE SHEET

LEVEL III GUIDE SHEET - KEY NO. 7 (Continued)

COMPONENT: SUPPORT STRUCTURES
CONTROL NUMBER: GS-III 25.01.03-7

Inspection Action

1. Prior to making a field inspection of the observed defect, review all past records concerning the primary and secondary members and the defective component if available. These records may include pre-construction investigation records, design criteria and analysis records, available construction records, previous periodic maintenance inspection records, water level records, and photographs taken during initial construction and subsequent inspections.

2. Perform inspection of the pertinent components where observed defects that triggered a Level III inspection are listed.

3. Make an assessment of the importance of individual defects observed for a given component at the dump trestle site. Indicate priorities for any required maintenance, or remedial measure work.

4. Identify whether particular observed defects need additional or continued observation.

5. Assess the stability and safety of the bearings.

6. Prepare final cost estimate for advanced inspection methods required to determine the cause and extent of the observed defect.

7. Prepare cost estimate for required maintenance or remedial repair measures, as applicable.

Level III advanced inspection methods may be required for specific Level I and Level II defect conditions observed at a coal dump trestle site. Level III advanced test or inspection methods and associated observed defects for trestle bearings include, but are not limited to the following:

Advanced Test or Inspection Method	Applicable Observed Defects
1. Grinding and or sandblasting, using caliper to measure section loss	corrosion of steel and section loss
2. Magnetic particle	cracks in steel or welds
3. Dye-Penetrant	cracks in steel or welds
4. Ultrasonic test	cracks and voids in steel

LEVEL III INSPECTION METHOD GUIDE SHEET

LEVEL III GUIDE SHEET - KEY NO. 7 (Continued)

COMPONENT: SUPPORT STRUCTURE
CONTROL NUMBER: GS-III 25.01.03-7

Special Instructions

Review as-built and design drawings of structure.

Special Tools & Equipment Requirements

Grinder or sandblasting equipment
Surveying equipment
Industry required testing equipment needed to perform the advanced investigation method chosen

Recommended Inspection Frequency

As triggered by Level I and II defect/observations or every 3 years.

References

1. U.S. Department of Transportation, Federal Highway Administration, Bureau of Public Roads (DOT) Bridge Inspector's Training Manual, 1990 Edition

2. Bridge Inspection and Rehabilitation, Parsons Brinkerhoff Edited by L.G. Silano, PE, 1993

3. Inspection of Bridges and Trestles NAVFAC MO-126, October 1991

LEVEL III INSPECTION METHOD GUIDE SHEET

LEVEL III GUIDE SHEET - KEY NO. 8

COMPONENT: SUPPORT STRUCTURE
CONTROL NUMBER: GS-III 25.01.03-8

Application

This guide has been prepared to identify the purpose of a Level III inspection and its more sophisticated test and inspection methods which may be appropriate to determine the cause and/or extent of defects recorded in Level I or Level II defect observations at the concrete primary and secondary members.

Whereas the purpose of the Level I inspection was to record the observable defects on the primary and secondary members, this Level III inspection is performed to provide a thorough systematic evaluation of the observed defect and to make an assessment of its effects, if left unchecked, on the safety, durability and stability of the primary and secondary members and its appurtenant works.

The Level III inspection should be performed when prompted by the results of a Level I or II inspection. The inspection should be performed by an engineer or multidisciplined team of engineers experienced in the design and construction of coal dump trestles or similar structures.

The results of the Level III inspection will be used to develop maintenance or remedial measure work strategy that will correct the existing deficiency conditions or to require continued monitoring of existing deficiency conditions on the coal dump trestle.

In general, appropriate advanced inspection methods will be identified, recommended, and performed by or under the supervision of the inspection engineer personnel as part of the Level III test and inspection method. Advanced inspection methods will be assigned only after the assessment of defect conditions observed during a Level I or II inspection.

Special Safety Equipment

Special safety equipment needed for the Level III inspection of the primary and secondary members are listed in the standards developed for the Standard Inspection of the coal dump trestle.

Special Safety Requirements

Special safety requirements are as set forth in the standards developed for the Standard Inspection of the coal dump trestle.

LEVEL III INSPECTION METHOD GUIDE SHEET

LEVEL III GUIDE SHEET - KEY NO. 8 (Continued)

COMPONENT: SUPPORT STRUCTURE
CONTROL NUMBER: GS-III 25.01.03-8

Inspection Action

1. Prior to making a field inspection of the observed defect, review all past records concerning the primary and secondary members and the defective component if available. These records may include pre-construction investigation records, design criteria and analysis records, available construction records, previous periodic maintenance inspection records, water level records, and photographs taken during initial construction and subsequent inspections.

2. Perform inspection of the pertinent components where observed defects that triggered a Level III inspection are listed.

3. Make an assessment of the importance of individual defects observed for a given component at the dump trestle site. Indicate priorities for any required maintenance, or remedial measure work.

4. Identify whether particular observed defects need additional or continued observation.

5. Assess the stability and safety of the structure.

6. Prepare final cost estimate for advanced inspection methods required to determine the cause and extent of the observed defect.

7. Prepare cost estimate for required maintenance or remedial repair measures, as applicable.

Level III advanced inspection methods may be required for specific Level I and Level II defect conditions observed at a coal dump trestle site. Level III advanced test or inspection methods and associated observed defects for primary and secondary members include, but are not limited to the following:

LEVEL III INSPECTION METHOD GUIDE SHEET

LEVEL III GUIDE SHEET - KEY NO. 8 (Continued)

COMPONENT: SUPPORT STRUCTURE
CONTROL NUMBER: GS-III 25.01.03-8

Advanced Test or Inspection Method		Applicable Observed Defects
1.	Concrete coring	concrete deterioration, cracking, spalling
2.	Laboratory test on concrete (core, strength tests, abrasion, absorption,sulfate soundness, unit weight)	concrete deterioration and strength
3.	Ultrasonic test	internal cracks and spalling, delamination
4.	Magnetic or half-cell test	corrosion to reinforcement steel

Special Instructions

Review as-built and design drawings of structure.

Special Tools & Equipment Requirements

Industry required testing equipment needed to perform the advanced investigation method chosen.
Surveying equipment

Recommended Inspection Frequency

As triggered by Level I and II defect/observations or every 3 years.

References

1. U.S. Department of Transportation, Federal Highway Administration, Bureau of Public Roads (DOT) Bridge Inspector's Training Manual, 1990 Edition

2. Bridge Inspection and Rehabilitation, Parsons Brinkerhoff Edited by L.G. Silano, PE, 1993

3. Inspection of Bridges and Trestles NAVFAC MO-126, October 1991

LEVEL III INSPECTION METHOD GUIDE SHEET

LEVEL III GUIDE SHEET - KEY NO. 9

COMPONENT: SUPPORT STRUCTURE
CONTROL NUMBER: GS-III 25.01.03-9

Application

This guide has been prepared to identify the purpose of a Level III inspection and its more sophisticated test and inspection methods which may be appropriate to determine the cause and/or extent of defects recorded in Level I or Level II defect observations at the concrete or steel primary and secondary members of the support structure.

Whereas the purpose of the Level I inspection was to record the observable defects on the support structure primary and secondary members, this Level III inspection is performed to provide a thorough systematic evaluation of the observed defect and to make an assessment of its effects, if left unchecked, on the safety, durability and stability of the support structure and its appurtenant works.

The Level III inspection should be performed when prompted by the results of a Level I or II inspection. The inspection should be performed by an engineer or multidisciplined team of engineers experienced in the design and construction of coal dump trestles or similar structures.

The results of the Level III inspection will be used to develop maintenance or remedial measure work strategy that will correct the existing deficiency conditions or to require continued monitoring of existing deficiency conditions on the coal dump trestle.

In general, appropriate advanced inspection methods will be identified, recommended, and performed by or under the supervision of the inspection engineer personnel as part of the Level III test and inspection method. Advanced inspection methods will be assigned only after the assessment of defect conditions observed during a Level I or II inspection.

Special Safety Equipment

Special safety equipment needed for the Level III inspection of the primary and secondary members are listed in the standards developed for the Standard Inspection of the coal dump trestle.

Special Safety Requirements

Special safety requirements are as set forth in the standards developed for the Standard Inspection of the coal dump trestle.

LEVEL III INSPECTION METHOD GUIDE SHEET

LEVEL III GUIDE SHEET - KEY NO. 9 (Continued)

COMPONENT: SUPPORT STRUCTURE
CONTROL NUMBER: GS-III 25.01.03-9

Inspection Action

1. Prior to making a field inspection of the observed defect, review all past records concerning the primary and secondary members and the defective component if available. These records may include pre-construction investigation records, design criteria and analysis records, available construction records, previous periodic maintenance inspection records, water level records, and photographs taken during initial construction and subsequent inspections.

2. Perform inspection of the pertinent components where observed defects that triggered a Level III inspection are listed.

3. Make an assessment of the importance of individual defects observed for a given component at the coal dump trestle site. Indicate priorities for any required maintenance, or remedial measure work.

4. Identify whether particular observed defects need additional or continued observation.

5. Assess the stability and safety of the structure.

6. Prepare final cost estimate for advanced inspection methods required to determine the cause and extent of the observed defect.

7. Prepare cost estimate for required maintenance or remedial repair measures, as applicable.

Level III advanced inspection methods may be required for specific Level I and Level II defect conditions observed at a coal dump trestle site. Level III advanced test or inspection methods and associated observed defects for support structure primary and secondary members include, but are not limited to the following:

LEVEL III INSPECTION METHOD GUIDE SHEET

LEVEL III GUIDE SHEET - KEY NO. 9 (Continued)

COMPONENT: SUPPORT STRUCTURE
CONTROL NUMBER: GS-III 25.01.03-9

Advanced Test or Inspection Method		Applicable Observed Defects
1.	Concrete coring	concrete deterioration, cracking, spalling
2.	Laboratory test on concrete (core, strength tests, abrasion, absorption,sulfate soundness, unit weight)	concrete deterioration and strength
3.	Ultrasonic test	internal cracks and spalling, delamination
4.	Magnetic or half-cell test	corrosion to reinforcement steel
5.	Grinding and or sandblasting, using caliper to measure section loss	corrosion of steel and section loss
6.	Magnetic particle	cracks in steel or welds
7.	Dye-Penetrant	cracks in steel or welds
8.	Ultrasonic test	cracks and voids in steel

Special Instructions

Review as-built and design drawings of structure.

Special Tools & Equipment Requirements

Grinder or sandblasting equipment
Industry required testing equipment needed to perform the advanced investigation method chosen.
Surveying equipment

Recommended Inspection Frequency

As triggered by Level I and II defect/observations or every 3 years.

LEVEL III INSPECTION METHOD GUIDE SHEET

LEVEL III GUIDE SHEET - KEY NO. 9 (Continued)

COMPONENT: SUPPORT STRUCTURE
CONTROL NUMBER: GS-III 25.01.03-9

References

1. U.S. Department of Transportation, Federal Highway Administration, Bureau of Public Roads (DOT) Bridge Inspector's Training Manual, 1990 Edition

2. Bridge Inspection and Rehabilitation, Parsons Brinkerhoff Edited by L.G. Silano, PE, 1993

3. Inspection of Bridges and Trestles NAVFAC MO-126, October 1991

LEVEL III INSPECTION METHOD GUIDE SHEET

LEVEL III GUIDE SHEET - KEY NO. 10

COMPONENT: SUPPORT STRUCTURE
CONTROL NUMBER: GS-III 25.01.03-10

Application

This guide has been prepared to identify the purpose of a Level III inspection and its more sophisticated test and inspection methods which may be appropriate to determine the cause and/or extent of defects recorded in Level I or Level II defect observations at the support structure bearings.

Whereas the purpose of the Level I inspection was to record the observable defects at the bearing, this Level III inspection is performed to provide a thorough systematic evaluation of the observed defect and to make an assessment of it's effects, if left unchecked, on the safety, durability and stability of the support structure and it's appurtenant works.

The Level III inspection should be performed when prompted by the results of a Level I or II inspection. The inspection should be performed by an engineer or multidisciplined team of engineers experienced in the design and construction of coal dump trestles or similar structures.

The results of the Level III inspection will be used to develop maintenance or remedial measure work strategy that will correct the existing deficiency conditions or to require continued monitoring of existing deficiency conditions on the coal dump trestle.

In general, appropriate advanced inspection methods will be identified, recommended, and performed by or under the supervision of the inspection engineer personnel as part of the Level III test and inspection method. Advanced inspection methods will be assigned only after the assessment of defect conditions observed during a Level I or II inspection.

Special Safety Equipment

Special safety equipment needed for the Level III inspection of the primary and secondary members are listed in the standards developed for the Standard Inspection of the coal dump trestle.

Special Safety Requirements

Special safety requirements are as set forth in the standards developed for the Standard Inspection of the coal dump trestle.

LEVEL III INSPECTION METHOD GUIDE SHEET

LEVEL III GUIDE SHEET - KEY NO. 10 (Continued)

COMPONENT: SUPPORT STRUCTURE
CONTROL NUMBER: GS-III 25.01.03-10

Inspection Action

1. Prior to making a field inspection of the observed defect, review all past records concerning the bearings and the defective component if available. These records may include pre-construction investigation records, design criteria and analysis records, available construction records, previous periodic maintenance inspection records, water level records, and photographs taken during initial construction and subsequent inspections.

2. Perform inspection of the pertinent components where observed defects that triggered a Level III inspection are listed.

3. Make an assessment of the importance of individual defects observed for a given component at the coal dump trestle. Indicate priorities for any required maintenance, or remedial measure work.

4. Identify whether particular observed defects need additional or continued observation.

5. Assess the stability and safety of the bearings.

6. Prepare final cost estimate for advanced inspection methods required to determine the cause and extent of the observed defect.

7. Prepare cost estimate for required maintenance or remedial repair measures, as applicable.

Level III advanced inspection methods may be required for specific Level I and Level II defect conditions observed at a coal dump trestle. Level III advanced test or inspection methods and associated observed defects for the bearings include, but are not limited to the following:

LEVEL III INSPECTION METHOD GUIDE SHEET

LEVEL III GUIDE SHEET - KEY NO. 10 (Continued)

COMPONENT: SUPPORT STRUCTURE
CONTROL NUMBER: GS-III 25.01.03-10

Advanced Test or Inspection Method		Applicable Observed Defects
1.	Grinding or sandblasting, using caliper to measure section loss	corrosion of steel and section loss
2.	Magnetic particle	cracks in steel or welds
4.	Dye-Penetrant	cracks in steel or welds
5.	Ultrasonic test	cracks and voids in steel
6.	Survey measurements	bearing movement

Special Instructions

Review as-built and design drawings of structure.

Special Tools & Equipment Requirements

Grinder or sandblasting equipment
Surveying equipment
Industry required testing equipment needed to perform the advanced investigation method chosen

Recommended Inspection Frequency

As triggered by Level I and II defect/observations or every 3 years.

References

1. U.S. Department of transportation, Federal Highway Administration, Bureau of Public roads (DOT) Bridge Inspector's Training Manual, 1990 Edition

2. Bridge inspection and Rehabilitation, Parsons Brinckerhoff Edited by L.G. Silano, PE, 1993

3. Inspection of Bridges and Trestles NAVFAC MO-126, October 1991

4. AASHTO Manual for Maintenance Inspection of Bridges, American Association of State Highway and Transportation Officials

5. Micro Bridger (Version 1.0), U.S. Army Construction Engineering Research Laboratory

25.02 CONVEYORS, COAL

DESCRIPTION

Coal conveyors are a subsystem of Coal Site Handling and Storage Systems. They are materials handling machines designed to move free-flowing bulk coal in various particle sizes over a horizontal, inclined, declined, or vertical path of travel with continuous motion. A conveyor consists of a frame and supports, belt and rollers or buckets and chain, drive assembly, and controls.

SPECIAL TOOL AND EQUIPMENT REQUIREMENTS

No special tools are needed for the inspection of conveyors beyond those listed in the Standard Equipment Requirements section of the introduction.

SPECIAL SAFETY REQUIREMENTS

No special safety requirements are needed for the inspection of the conveyors, beyond the requirements listed in the Master Safety Plan and System Safety Section.

COMPONENT LIST

- 25.02.01 CONVEYOR HOUSING
- 25.02.02 SUPPORT STRUCTURE/FRAME
- 25.02.03 BELT
- 25.02.04 ROLLERS, CARRYING/RETURN/SNUB
- 25.02.05 PULLEY, DRIVE/TAIL/TAKE-UP
- 25.02.06 TAKE-UP DEVICE
- 25.02.07 BUCKETS
- 25.02.08 BUCKET CHAIN
- 25.02.09 PLATFORM/HANDRAIL/LADDER/SAFETY CAGE
- 25.02.10 MOTOR/GEARMOTOR
- 25.02.11 SHEAVES AND V-BELT
- 25.02.12 SPROCKETS AND DRIVE CHAIN
- 25.02.13 CONTROLS

RELATED SUBSYSTEMS

Due to the related nature of the elements requiring inspection, the following systems and subsystems should be reviewed for concurrent inspection.

02.01	STRUCTURAL FRAMES
02.02	FLOOR FRAMING AND DECKS
10.00	BUILDING ELECTRICAL (All subsystems)
10.02	LOW VOLTAGE DIST. SYSTEM 600V OR LESS
29.00	SITE ELECTRICAL (All subsystems)

25.02 CONVEYORS, COAL

STANDARD INSPECTION PROCEDURE

Coal conveyor inspection requires both Level I and Level II inspections as part of the basic inspection process. Additional Level II or Level III inspections may be indicated or "triggered" by Level I defect observations. Any additional Level II inspections should be accomplished by the inspector at the time of the Level I inspection. Associated defects and observations, for each major component of the coal conveyor, are listed in the inspector's Data Collection Device.

The coal conveyor will be inspected while it is running. Those items requiring inspection with the conveyor stopped are so noted.

COMPONENTS

◆ 25.02.01 CONVEYOR HOUSING

The coal conveyor housing is a shelter designed to protect moving conveyor components from rain and dust. The housing is usually fabricated of structural shapes and painted or galvanized sheet metal. The housing is usually built with hinged or removable panels to provide access to the covered parts.

Defect:	UOM	LEVEL II KEY	LEVEL III KEY
* **Corrosion:**			
Observation:			
a. Surface corrosion (no pitting evident).	SF		
***{Severity L}			
b. Corrosion evidenced by pitting or blistering.	SF		
***{Severity M}			
c. Corrosion evidenced by holes or loss of base metal.	SF		
***{Severity H}			
Defect:			
* **Connections:**			
Observation:			
a. Access panel hinges are loose, bent, or damaged.	EA		
***{Severity L}			
b. Access panel latches loose, bent, or damaged.	EA		
***{Severity L}			
c. Loose bolts or fasteners.	EA		
***{Severity M}			

25.02 CONVEYORS, COAL

COMPONENTS (Continued)

◆ **25.02.01 CONVEYOR HOUSING (Continued)**

Defect:	UOM	LEVEL II KEY	LEVEL III KEY
* **Connections (Continued):**			
d. Broken or missing nuts, bolts, or rivets.	EA		
***{Severity H}			
e. Cracked or broken weld.	EA		
***{Severity H}			
f. Access panel hinges are missing or broken.	EA		
***{Severity H}			
g. Access panel latches missing or broken.	EA		
***{Severity H}			
Defect:			
* **Physical Damage or Wear:**			
Observation:			
a. Housing panels are dented, bent, torn, or damaged.	EA		
***{Severity M}			
b. Housing frame components bent, broken, or damaged.	EA		
***{Severity M}			
c. Housing frame components missing.	EA		
***{Severity H}			
d. Housing panels or sections are missing.	EA		
***{Severity H}			
Defect:			
* **Paint:**			
Observation:			
a. Paint is worn; metal not showing.	SF		
***{Severity L }			
b. Paint is worn; metal is showing.	SF		
***{Severity M}			
c. Paint is scratched, chipped, flaking, chalked, or blistered.	SF		
***{Severity M}			

25.02 CONVEYORS, COAL

COMPONENTS (Continued)

◆ 25.02.02 SUPPORT STRUCTURE/FRAME

The coal conveyor support structure and frame is a rectangular, structural assembly designed to provide shape, strength and support for the conveyor. It is usually fabricated of welded or bolted steel shapes.

Defect:	UOM	LEVEL II KEY	LEVEL III KEY
*** Corrosion:**			
Observation:			
a. Surface corrosion (no pitting evident).	SF		
***{Severity L}			
b. Corrosion evidenced by pitting or blistering.	SF		
***{Severity M}			
c. Corrosion evidenced by holes or loss of base metal.	SF		
***{Severity H}			
Defect:			
*** Connections:**			
Observation:			
a. Loose bolts or fasteners.	EA		
***{Severity M}			
b. Broken or missing nuts, bolts, or rivets.	EA		
***{Severity H}			
c. Cracked or broken weld.	EA		
***{Severity H}			
Defect:			
*** Physical Damage or Wear:**			
Observation:			
a. Frame or frame member out of alignment.	EA		
***{Severity H}			
b. Frame member missing, cracked or bent.	EA		
***{Severity H}			

25.02 CONVEYORS, COAL

COMPONENTS (Continued)

◆ **25.02.02 SUPPORT STRUCTURE/FRAME (Continued)**

Defect:	UOM	LEVEL II KEY	LEVEL III KEY
*** Paint:**			
Observation:			
a. Paint is worn; metal not showing.	SF		
***{Severity L}			
b. Paint is worn; metal is showing.	SF		
***{Severity M}			
c. Paint is scratched, chipped, flaking, chalked, or blistered.	SF		
***{Severity M}			

25.02 CONVEYORS, COAL

COMPONENTS (Continued)

◆ 25.02.03 BELT

The coal conveyor belt is a flexible fabric, rubber, or composition band used to carry bulk coal. The belt is endless (by means of a splice) and may be of single or multiple ply construction. It may have a special coating or cover on one or both sides to protect it from the weather or the coal or to provide friction with the pulleys or coal. The belt may be flat or held in a troughed shape by the rollers or idlers. Belt type conveyors are used to transport coal over all distances and through moderate inclines and declines.

Defect:	UOM	LEVEL II KEY	LEVEL III KEY
*** Operation:**			
Observation:			
a. Belt operation is jerky or speed variable.	EA		
***{Severity M}			
b. Belt tracks to one side during operation.	EA		1
***{Severity M}			
Defect:			
*** Physical Wear or Damage:**			
Stop the conveyor for this inspection.			
Observation:			
a. Belt is cut, torn, abraded, or damaged, carcass not showing.	EA		
***{Severity M}			
b. Belt coating or cover is separated from or worn to the carcass.	SF		
***{Severity H}			
c. Belt is cut, torn, abraded, or damaged with carcass showing.	EA		
***{Severity H}			
d. Belt splice broken, cracked, or otherwise damaged.	EA		
***{Severity H}			
e. Belt edge is cut, torn, or damaged with carcass showing.	LF		
***{Severity H}			

25.02 CONVEYORS, COAL

COMPONENTS (Continued)

◆ 25.02.04 ROLLERS, CARRYING/RETURN/SNUB

A roller or idler is a round rotating cylinder that carries the conveyor belt. Rollers are usually made of formed sheet metal and have a concentric shaft with internal permanently lubricated bearings. Carrying rollers support the belt in the area where the load is carried. The ends of the carrying roller shaft may be supported by brackets attached to the conveyor frame or by the frame itself. Return rollers carry the belt on its return run from the head end to the tail end of the conveyor. Snub rollers are rollers used to increase the arc of contact between the belt and the drive, tail, or take-up pulley. Carrying rollers in the loading or impact area may be covered with or made of a resilient material to cushion the impact of loading.

Defect:	UOM	LEVEL II KEY	LEVEL III KEY
*** Corrosion:**			
Stop the conveyor for this inspection.			
Observation:			
a. Surface corrosion (no pitting evident).	SF		
***{Severity L}			
b. Corrosion evidenced by pitting or blistering.	SF		
***{Severity M}			
c. Corrosion evidenced by holes or loss of base metal.	SF		
***{Severity H}			
Defect:			
*** Physical Damage or Wear:**			
Stop the conveyor for this inspection.			
Observation:			
a. Roller surface is dented or worn.	EA		
***{Severity L}			
b. Roller makes loud or unusual noise.	EA		
***{Severity M}			
c. Roller shaft has excess play within bearing.	EA		
***{Severity M}			
d. Roller shaft is loose at support point.	EA		
***{Severity M			
e. Roller is out of alignment with rest of conveyor components.	EA		
***{Severity M}			

25.02 CONVEYORS, COAL

COMPONENTS (Continued)

◆ **25.02.04 ROLLERS, CARRYING/RETURN/SNUB (Continued)**

Defect:	UOM	LEVEL II KEY	LEVEL III KEY
*** Physical Damage or Wear: (Continued)**			
Stop the conveyor for this inspection.			
f. Roller coating is missing or damaged.	EA		
***{Severity M}			
g. Roller support bracket is bent or damaged.	EA		
***{Severity M}			
h. Roller does not rotate.	EA		
***{Severity H}			
i. Roller is cracked or bent.	EA		
***{Severity H}			
j. Roller support bracket is missing or broken.	EA		
***{Severity H}			
Defect:			
*** Paint:**			
Stop the conveyor for this inspection.			
Observation:			
a. Paint is worn; metal not showing.	SF		
***{Severity L}			
b. Paint is worn; metal is showing.	SF		
***{Severity M}			
c. Paint is scratched, chipped, flaking, chalked, or blistered.	SF		
***{Severity M}			

25.02 CONVEYORS, COAL

COMPONENTS (Continued)

◆ 25.02.05 PULLEYS, DRIVE/TAIL/TAKE-UP

A pulley is a round rotating wheel used to transmit energy or force to or change the direction of a belt. Pulleys are usually made of formed sheet metal and are mounted on a concentric shaft with external bearings. Pulleys may have a crowned face for centering the belt on the pulley. Pulleys may be covered or coated with a resilient material to reduce wear on the pulley face, effect a self-cleaning action on the pulley surface, or increase the coefficient of friction between the belt and pulley. The drive pulley transmits energy or force to the belt. The tail pulley changes the direction of the belt at the loading or input end of the belt. The take-up pulley (which may be the tail pulley) is used to adjust tension on the belt.

Defect:	UOM	LEVEL II KEY	LEVEL III KEY
*** Corrosion:**			
Stop the conveyor for this inspection.			
Observation:			
a. Surface corrosion (no pitting evident).	SF		
***{Severity L}			
b. Corrosion evidenced by pitting or blistering.	SF		
***{Severity M}			
c. Corrosion evidenced by holes or loss of base metal.	SF		
***{Severity H}			
Defect:			
*** Physical Damage or Wear:**			
Stop the conveyor for this inspection.			
Observation:			
a. Pulley surface is dented or worn.	EA		
***{Severity L}			
b. Pulley makes loud or unusual noise.	EA		
***{Severity M}			
c. Pulley is out of alignment with rest of conveyor components.	EA		
***{Severity M}			
d. Pulley coating is missing or damaged.	EA		
***{Severity M}			
e. Pulley shaft has excess play within bearing.	EA		2
***{Severity M}			

25.02 CONVEYORS, COAL

COMPONENTS (Continued)

◆ **25.02.05 PULLEYS, DRIVE/TAIL/TAKE-UP (Continued)**

Defect:	UOM	LEVEL II KEY	LEVEL III KEY
*** Physical Damage or Wear: (Continued)**			
Stop the conveyor for this inspection.			
f. Pulley does not rotate.	EA		
***{Severity H}			
g. Pulley is cracked or bent.	EA		
***{Severity H}			
h. Pulley bearing is not lubricated.	EA		
***{Severity H}			
Defect:			
*** Paint:**			
Stop the conveyor for this inspection.			
Observation:			
a. Paint is worn; metal not showing.	SF		
***{Severity L}			
b. Paint is worn; metal is showing.	SF		
***{Severity M}			
c. Paint is scratched, chipped, flaking, chalked, or blistered.	SF		
***{Severity M}			

25.02 CONVEYORS, COAL

COMPONENTS (Continued)

◆ 25.02.06 TAKE-UP DEVICE

The take-up device is a mechanical device that uses an adjustable pulley mounting to compensate for changes in belt length due to wear, climatic conditions, stretch, planned excess length, etc. The take-up device may make use of the tail pulley or another pulley provided specifically for take-up duty. The take-up device may be manual, usually screw type, or automatic with power provided by springs, gravity, or hydraulic, electric, or pneumatic means.

Defect:	UOM	LEVEL II KEY	LEVEL III KEY
*** Corrosion:**			
Observation:			
a. Surface corrosion (no pitting evident).	SF		
***{Severity L}			
b. Corrosion evidenced by pitting or blistering.	SF		
***{Severity M}			
c. Corrosion evidenced by holes or loss of base metal.	SF		
***{Severity H}			
Defect:			
*** Connections:**			
Observation:			
a. Loose bolts or fasteners.	EA		
***{Severity M}			
b. Broken or missing nuts, bolts, or rivets.	EA		
***{Severity H}			
c. Cracked or broken weld.	EA		
***{Severity H}			
Defect:			
*** Physical Damage or Wear:**			
Observation:			
a. Take-up device member worn but part not distorted.	EA		
***{Severity L}			
b. Take-up device member worn with distortion of part.	EA		
***{Severity M}			
c. Take-up device member missing, cracked or bent.	EA		
***{Severity H}			

25.02 CONVEYORS, COAL

COMPONENTS (Continued)

◆ **25.02.06 TAKE-UP DEVICE (Continued)**

Defect:	UOM	LEVEL II KEY	LEVEL III KEY
* **Physical Damage or Wear (Continued):**			
d. Take-up device or member out of alignment.	EA		
***{Severity H}			
e. Take-up device does not operate.	EA		3
***{Severity H}			

Defect:

* **Paint:**			
Observation:			
a. Paint is worn; metal not showing.	SF		
***{Severity L}			
b. Paint is worn; metal is showing.	SF		
***{Severity M}			
c. Paint is scratched, chipped, flaking, chalked, or blistered.	SF		
***{Severity M}			

25.02 CONVEYORS, COAL

COMPONENTS (Continued)

◆ 25.02.07 BUCKETS

Buckets are cast iron or fabricated steel pockets designed to pick up and carry coal or other bulk materials. They are usually attached to an endless belt or chain. Bucket conveyors are used to convey material through vertical or steeply inclined paths.

Defect:	UOM	LEVEL II KEY	LEVEL III KEY
*** Corrosion:**			
Stop the conveyor for this inspection.			
Observation:			
a. Surface corrosion (no pitting evident).	SF		
***{Severity L}			
b. Corrosion evidenced by pitting or blistering.	SF		
***{Severity M}			
c. Corrosion evidenced by holes or loss of base metal.	SF		
***{Severity H}			
Defect:			
*** Connections:**			
Stop the conveyor for this inspection.			
Observation:			
a. Loose bolts or fasteners.	EA		
***{Severity M}			
b. Broken or missing nuts, bolts, or rivets.	EA		
***{Severity H}			
c. Cracked or broken weld.	EA		
***{Severity H}			
Defect:			
*** Physical Damage or Wear:**			
Stop the conveyor for this inspection.			
Observation:			
a. Bucket is out of alignment.	EA		
***{Severity L}			
b. Bucket has wear but is not distorted.	EA		
***{Severity L}			
c. Bucket is broken, cracked, or bent.	EA		
***{Severity M}			
d. Bucket is worn with some distortion.	EA		
***{Severity M}			

25.02 CONVEYORS, COAL

COMPONENTS (Continued)

◆ **25.02.07 BUCKETS (Continued)**

Defect:	UOM	LEVEL II KEY	LEVEL III KEY
*** Physical Damage or Wear (Continued):**			
e. Bucket is worn with severe distortion.	EA		
***{Severity H}			
f. Bucket is missing.	EA		
***{Severity H}			
Defect:			
*** Paint:**			
Stop the conveyor for this inspection.			
Observation:			
a. Paint is worn; metal not showing.	SF		
***{Severity L}			
b. Paint is worn; metal is showing.	SF		
***{Severity M}			
c. Paint is scratched, chipped, flaking, chalked, or blistered.	SF		
***{Severity M}			

25.02 CONVEYORS, COAL

COMPONENTS (Continued)

◆ 25.02.08 BUCKET CHAIN AND SPROCKETS

Bucket chain is an endless chain used to carry buckets around a conveyor path. Shaft mounted sprocket wheels transmit energy or force to and changes the direction of the chain.

Defect:	UOM	LEVEL II KEY	LEVEL III KEY
*** Chain:**			
Stop the conveyor for this inspection.			
Observation:			
a. Chain parts worn with distortion of part shape.	EA		
***{Severity M}			
b. Chain inadequately lubricated.	EA		
***{Severity M}			
c. Lubrication system damaged or not working.	EA		
***{Severity H}			
d. Drive chain parts cracked or broken.	EA		
***{Severity H}			

Defect:

*** Sprockets:**
Stop the conveyor for this inspection.
Observation:
a. Sprocket is loose or not square with shaft. EA
***{Severity M}
b. Sprocket teeth worn with distortion of tooth shape. EA
***{Severity M}
c. Sprocket teeth cracked or broken. EA
***{Severity H}

25.02 CONVEYORS, COAL

COMPONENTS (Continued)

◆ 25.02.09 PLATFORM/HANDRAIL/LADDER/SAFETY CAGE

Ladders are used to provide access to the coal conveyor platforms. The ladder is typically located at one of the support legs and ends at a platform adjacent to the conveyor.

Fabricated ladders should comply with all applicable OSHA requirements. Specific details, and anchorages typically follow the manufacturer's specifications.

Siderails are usually continuous steel flat bars, 3/8 x 2 inches minimum, with eased edges, spaced approximately 16 inches apart. Fabricated ladders typically have bar rungs that are round or square steel bars or shapes, 3/4 inch in diameter or surface dimension, spaced about 12 inches on-center. The supports at each ladder are at the top and bottom and at intermediate points typically spaced not more than 5 feet on-center by welded or bolted steel brackets.

Brackets are used to support the design and live loads of the ladder and to maintain a uniform distance between the centerline of ladder rungs and the wall surface.

A no-slip surface is sometimes applied to the top of each rung. The non-slip surface may be aluminum oxide granules set in epoxy resin adhesive, or a manufactured type of non-slip surface rung filled with aluminum oxide grout.

Ladder Safety Cages:

Fabricated safety cages must comply with all applicable OSHA requirements. The safety cage is attached to the ladder assembly by welding, bolting, or riveting. The primary hoops are typically made of steel bars that are 5/16 x 4 inches for top, bottom, and cages longer than 20 feet, intermediate bars spaced no more than 20 inches on-center. The secondary intermediate hoops are also usually made of steel bars that are 5/16 x 2 inches. Hoops are spaced no more than 4 feet on-center between primary hoops. The vertical bars are made of steel that is 5/16 x 2 inch, secured to each hoop, and spaced approximately 9 inches on-center. A safety device may be installed on the ladder system to engage a climbing harness to prevent falls.

Platforms:

Platforms are typically constructed of open metal grating. Hand rails are typically constructed from steel pipe securely attached to the platforms.

25.02 CONVEYORS, COAL

COMPONENTS (Continued)

◆ **25.02.09 PLATFORM/HANDRAIL/LADDER/SAFETY CAGE (Continued)**

Defect:	UOM	LEVEL II KEY	LEVEL III KEY
*** Corrosion:**			
a. Surface corrosion (no pitting evident).	SF		
***{Severity L}			
b. Corrosion evidenced by pitting or blistering.	SF		
***{Severity M}			
c. Corrosion evidenced by holes or loss of base metal.	SF		
***{Severity H}			
Defect:			
*** Connections:**			
Observation:			
a. Loose bolts or fasteners.	EA		
***{Severity M}			
b. Broken or missing nuts, bolts, or rivets.	EA		
***{Severity H}			
c. Cracked or broken weld.	EA		
***{Severity H}			
Defect:			
*** Physical Damage or Wear:**			
Observation:			
a. Component is out of alignment.	EA		
***{Severity L}			
b. Component is worn but is not distorted.	EA		
***{Severity L}			
c. Component is worn with some distortion of part.	EA		
***{Severity M}			
d. Component is loose, broken, cracked, or bent.	EA		
***{Severity M}			
e. Component is missing.	EA		
***{Severity H}			
f. Component is worn with severe distortion of part.	EA		
***{Severity H}			

25.02 CONVEYORS, COAL

COMPONENTS (Continued)

◆ **25.02.09 PLATFORM/HANDRAIL/LADDER/SAFETY CAGE (Continued)**

Defect:	UOM	LEVEL II KEY	LEVEL III KEY
* **Paint:**			
Observation:			
a. Paint is worn; metal not showing.	SF		
***{Severity L}			
b. Paint is worn; metal is showing.	SF		
***{Severity M}			
c. Paint is scratched, chipped, flaking, chalked, or blistered.	SF		
***{Severity M}			

25.02 CONVEYORS, COAL

COMPONENTS (Continued)

◆ 25.02.10 MOTOR/GEARMOTOR

The conveyor is driven by an electrical motor or gearmotor. The gear reducer housing may or may not be an integral part of the motor.

Defect:	UOM	LEVEL II KEY	LEVEL III KEY
*** Corrosion:**			
Observation:			
a. Surface corrosion (no pitting evident).	SF		
***{Severity L}			
b. Corrosion evidenced by pitting or blistering.	SF		
***{Severity M}			
c. Corrosion evidenced by holes or loss of base metal.	EA		
***{Severity H}			
Defect:			
*** Housekeeping:**			
Observation:			
a. Motor housings contaminated.	EA		
***{Severity L}			
b. Machine air passage dirty or clogged.	EA		
***{Severity M}			
Defect:			
*** Structure:**			
Observation:			
a. Motor frame cracked or broken.	EA		
***{Severity M}			
b. Motor support cracked or broken.	EA		
***{Severity M}			
c. Motor support shifted.	EA		
***{Severity M}			
d. Defective mounting pads.	EA		
***{Severity M}			
e. Loose or missing mounting bolts.	EA		
***{Severity H}			

25.02 CONVEYORS, COAL

COMPONENTS (Continued)

◆ 25.02.10 MOTOR/GEARMOTOR (Continued)

Defect:	UOM	LEVEL II KEY	LEVEL III KEY
*** Motor Operation:**			
Observation:			
a. Excessively noisy.	EA		4
***{Severity M }			
b. Excessive vibration.	EA		4
***{Severity M}			
c. Excessive sparking at the collector rings, commutator, or brushes.	EA		5
***{Severity M}			
Defect:			
*** Power Connections:**			
Observation:			
a. Terminal box cover missing.	EA		
***{Severity L}			
b. Insulation of motor leads damaged or deteriorated.	EA	1	
***{Severity M}			
c. Taping improperly installed or deteriorated.	EA	1	
***{Severity M}			
d. Terminal connection inadequate.	EA	1	
***{Severity M}			
e. Unit not grounded.	EA	1	
***{Severity H}			
Defect:			
*** Hot Spots:**			
Observation:			
a. Terminal 5° to 24° C above ambient.	EA	2	6
***{Severity M}			
b. Terminal 25°C or more above ambient.	EA	2	6
***{Severity H}			

25.02 CONVEYORS, COAL

COMPONENTS (Continued)

◆ **25.02.10 MOTOR/GEARMOTOR (Continued)**

Defect:	UOM	LEVEL II KEY	LEVEL III KEY
*** Gear Reducer:**			
Stop the conveyor for this inspection item "l".			
Observation:			
a. Gear reducer housing has surface rust, no pitting evident. ***{Severity L}	SF		
b. Oil dipstick missing or damaged. ***{Severity L}	EA		
c. Gear reducer corrosion with pitting and blistering of base metal. ***{Severity M}	SF		
d. Oil leak with oil wetting gear reducer housing surfaces. ***{Severity M}	EA		
e. Gear reducer housing cracked, dented, or otherwise damaged. ***{Severity M}	EA		
f. Output rotation speed is irregular. ***{Severity M}	EA		7
g. Gear reducer corrosion with loss of base metal. ***{Severity H}	SF		
h. Oil lubrication connection missing or damaged. ***{Severity H}	EA		
i. Oil leak with oil pooling below gear reducer. ***{Severity H}	EA		
j. Unit vibrates or makes loud or unusual noise during operation. ***{Severity H}	EA		8
k. Damaged, loose, or missing nuts, bolts, or fasteners. ***{Severity H}	EA		
l. Loose or damaged coupling. ***{Severity H}	EA		

25.02 CONVEYORS, COAL

COMPONENTS (Continued)

◆ 25.02.11 SHEAVES AND V-BELTS

Sheaves and v-belts are a means of transferring energy or force from the motor/gearmotor to the conveyor drive pulley or sprocket.

Defect:	UOM	LEVEL II KEY	LEVEL III KEY
*** Sheaves:**			
Stop the conveyor for this inspection.			
Observation:			
a. Sheave is loose or not square with shaft.	EA		
***{Severity M}			
b. Sheave is worn with noticeable loss of base metal.	EA		
***{Severity M}			
c. Sheave is bent, cracked or broken.	EA		
***{Severity H}			
Defect:			
*** V-Belt:**			
Stop the conveyor for this inspection.			
Observation:			
a. Belt is cracked, cut, torn, abraded, or otherwise damaged.	EA		
***{Severity M}			
b. V-belt loose; depresses 1/2-inch or more under finger pressure.	EA		
***{Severity M}			
c. Coating or cover is worn to extent carcass is showing.	EA		
***{Severity H}			

25.02 CONVEYORS, COAL

COMPONENTS (Continued)

◆ 25.02.12 SPROCKETS AND CHAIN

Sprockets and drive chain are a means of transferring energy or force from the motor/gearmotor to the drive pulley or sprocket.

Defect:	UOM	LEVEL II KEY	LEVEL III KEY
*** Sprockets:**			
Stop the conveyor for this inspection.			
Observation:			
a. Sprocket is loose or not square with shaft.	EA		
***{Severity M}			
b. Sprocket teeth worn with distortion of tooth shape.	EA		
***{Severity M}			
c. Sprocket teeth cracked or broken.	EA		
***{Severity H}			
Defect:			
*** Chain:**			
Stop the conveyor for this inspection.			
Observation:			
a. Chain parts worn with distortion of part shape.	EA		
***{Severity M}			
b. Drive chain parts cracked or broken.	EA		
***{Severity H}			
c. Oil lubrication system damaged or not working.	EA		
***{Severity H}			

25.02 CONVEYORS, COAL

COMPONENTS (Continued)

◆ 25.02.13 CONTROLS

Conveyor controls provide for the automatic and safe operation of the unit. An emergency stop control station will be located on or at a readily accessible location near conveyor. The emergency stop control station will have pushbuttons or switches for emergency control of the unit and may be equipped with pilot lights. The control panel, housing the overall monitoring and control of the conveyor may be located near the unit or in a central control area. The control panel consists of pilot lights, meters, audible alarms, etc. to monitor the conveyor and pushbuttons, switches, relays, microprocessor, etc. to control the conveyor.

Defect:	UOM	LEVEL II KEY	LEVEL III KEY
*** Corrosion - Control Stations:**			
Observation:			
a. Surface corrosion (no pitting evident).	SF		
***{Severity L}			
b. Corrosion evidenced by pitting or blistering.	SF		
***{Severity M}			
c. Corrosion evidenced by holes or loss of base metal.	SF		
***{Severity H}			
Defect:			
*** Physical Damage - Control Station:**			
Observation:			
a. Loose enclosure mounting.	EA		
***{Severity L}			
b. Indicating lamp inoperative.	EA		
***{Severity L}			
c. Indicating lens broken or missing.	EA		
***{Severity L}			
d. Enclosure damaged (cannot be sealed).	EA		
***{Severity M}			
e. Unused opening not covered.	EA		
***{Severity M}			
f. Pushbutton broken or missing.	EA		
***{Severity M}			
g. Selector switch broken or missing.	EA		
***{Severity M}			
h. Security devices missing or inoperable.	EA		
***{Severity H}			

25.02 CONVEYORS, COAL

COMPONENTS (Continued)

◆ **25.02.13 CONTROLS (Continued)**

Defect:	UOM	LEVEL II KEY	LEVEL III KEY
*** Corrosion - Control Panel:**			
Observation:			
a. Surface corrosion (no pitting evident).	SF		
***{Severity L}			
b. Corrosion evidenced by pitting or blistering.	SF		
***{Severity M}			
c. Corrosion evidenced by holes or loss of base metal.	SF		
***{Severity H}			
Defect:			
*** Physical Damage - Control Panel:**			
Observation:			
a. Loose enclosure mounting.	EA		
***{Severity L}			
b. Panel fastener loose, broken or missing.	EA		
***{Severity L)			
c. Indicating lamp inoperative.	EA		
***{Severity L}			
d. Indicating lens broken or missing.	EA		
***{Severity M}			
e. Enclosure damaged (cannot be sealed).	EA		
***{Severity M}			
f. Unused opening not covered.	EA		
***{Severity M}			
g. Pushbutton lens broken or missing.	EA		
***{Severity M}			
h. Selector switch broken or missing.	EA		
***{Severity M}			
i. Transformer discolored or blistered due to overheating.	EA	4	
***{Severity M}			
j. Security devices missing or inoperable.	EA		
***{Severity H}			
k. Door handle bent or inoperable.	EA		
***{Severity H}			

25.02 CONVEYORS, COAL

COMPONENTS (Continued)

◆ **25.02.13 CONTROLS (Continued)**

Defect:	UOM	LEVEL II KEY	LEVEL III KEY
*** Hot Spots - Control Panel:**			
Observation:			
a. Control transformer 5° to 24°C above ambient.	EA	3	9
***{Severity M}			
b. Control transformer 25°C or more above ambient.	EA	3	9
***{Severity H}			

25.02 CONVEYORS, COAL

REFERENCES

1. Belt Conveyors for Bulk Materials, Second Edition, Conveyor Equipment Manufacturers Association

2. Conveyor Terms and Definitions, ANSI/CEMA No. 102-1988, Conveyor Equipment Manufacturers Association

3. Conveyor Performance Terminology, CEMA Standard No. 705, Conveyor Equipment Manufacturers Association

4. Occupational Safety and Health Standards for General Industry, Occupational Safety and Health Administration, United States Department of Labor

5. Maintenance Technology/September 1993; Write-Up Title: "Infrared Keeps All Systems Go"

6. Raining - Agema Infrared Systems; "Measurement of Excess Temperatures with Infrared Scanners"

7. KATO Engineering, "Instruction Manual for Brushless Revolving Field Alternating Current Generators"

8. Marks' Standard Handbook for Mechanical Engineers, Eugene A. Avallone and Theodore Baumeister III, Ninth Edition, McGraw-Hill Book Company

9. "Handbook of Building and Plant Maintenance, Forms and Checklists" By Roger W. Liska and Judith Morrison Liska

10. R.S.Means Estimating Data, 1994

11. Sverdrup Corporation

25.02 CONVEYORS, COAL

LEVEL II KEY	GUIDE SHEET CONTROL NUMBER
1	GS-II 25.02.10-1
2	GS-II 25.02.10-2
3	GS-II 25.02.13-3
4	GS-II 25.02.13-4

LEVEL III KEY	GUIDE SHEET CONTROL NUMBER
1	GS-III 25.02.03-1
2	GS-III 25.02.05-2
3	GS-III 25.02.06-3
4	GS-III 25.02.10-4
5	GS-III 25.02.10-5
6	GS-III 25.02.10-6
7	GS-III 25.02.10-7
8	GS-III 25.02.10-8
9	GS-III 25.02.13-9

LEVEL II INSPECTION METHOD GUIDE SHEET

LEVEL II GUIDE SHEET - KEY NO. 1

COMPONENT: MOTOR/GEARMOTOR
CONTROL NUMBER: GS-II 25.02.10-1

Application

This guide applies to the investigation of the inside of an enclosure, containing bare, energized, electrical parts.

Special Safety Requirements

The following list of special safety requirements, beyond the requirements listed in the Master Safety Plan and System Safety Section, are to be observed in the performance of this inspection.

1. This inspection guide applies to enclosures containing live electrical parts having a potential of 600 volts or less above ground. If the enclosure contains circuitry of higher potential, do not use this inspection guide.

2. Any enclosure that is padlocked for safety reason is not to be opened unless okayed by the person having control of the key.

3. Inspector needs to carefully open, inspect the inside and close the enclosure without shutting down the equipment, and without creating a hazard to himself.

Inspection Actions

1. Open panels or doors carefully as required for doing the visual inspection.

2. Visually inspect for those physical damaged defects that are listed and tagged Level II Key No. as indicated above.

3. Close panels or doors carefully after the inspection is completed.

Recommended Inspection Frequency

Do a Level II inspection each time a Level I inspection indicates one is required.

References

1. Sverdrup Corporation

LEVEL II INSPECTION METHOD GUIDE SHEET

LEVEL II GUIDE SHEET - KEY NO. 2

COMPONENT: MOTOR/GEARMOTOR
CONTROL NUMBER: GS-II 25.02.10-2

Application

This guide applies to the investigation of the inside of an enclosure, containing bare, energized, electrical parts.

Special Safety Requirements

The following list of special safety requirements, beyond the requirements listed in the Master Safety Plan and System Safety Section, are to be observed in the performance of this inspection.

1. This inspection guide applies to enclosures containing live electrical parts having a potential of 600 volts or less above ground. If the enclosure contains circuitry of higher potential, do not use this inspection guide.

2. Any enclosure that is padlocked for safety reason is not to be opened unless okayed by the person having control of the key.

3. Inspector needs to carefully open, inspect the inside and close the enclosure without shutting down the equipment, and without creating a hazard to himself.

Inspection Actions

1. Open panels or doors carefully and to the degree required for scanning those devices being tested.

2. Make temperature measurements with an infrared scanner.

3. Measure the ambient temperature by measuring a spot on the inside of the enclosure that is least effected by any internal panel heat source.

4. Measure the temperature of the device specified.

5. Above-ambient temperature is calculated by subtracting the ambient temperature from the device temperature.

6. Record the results.

7. Close panels or doors carefully after the inspection is complete.

LEVEL II INSPECTION METHOD GUIDE SHEET

LEVEL II GUIDE SHEET - KEY NO. 2 (Continued)

COMPONENT: MOTOR/GEARMOTOR
CONTROL NUMBER: GS-II 25.02.10-2

Recommended Inspection Frequency

Do a Level II inspection each time a Level I inspection is made.

References

1. Maintenance Technology/September 1993; Write-up Title: *"Infrared Keeps All Systems Go"*

2. Raining - Agema Infrared Systems; *"Measurement of Excess Temperatures with Infrared Scanners"*

LEVEL II INSPECTION METHOD GUIDE SHEET

LEVEL II GUIDE SHEET - KEY NO. 3

COMPONENT: CONTROLS
CONTROL NUMBER: GS-II 25.02.13-3

Application

This guide applies to the investigation of the inside of an enclosure, containing bare, energized, electrical parts.

Special Safety Requirements

The following list of special safety requirements, beyond the requirements listed in the Master Safety Plan and System Safety Section, are to be observed in the performance of this inspection.

1. This inspection guide applies to enclosures containing live electrical parts having a potential of 600 volts or less above ground. If the enclosure contains circuitry of higher potential, do not use this inspection guide.

2. Any enclosure that is padlocked for safety reason is not to be opened unless okayed by the person having control of the key.

3. Inspector needs to carefully open, inspect the inside and close the enclosure without shutting down the equipment, and without creating a hazard to himself.

Inspection Actions

1. Open panels or doors carefully and to the degree required for scanning those devices being tested.

2. Make temperature measurements with an infrared scanner.

3. Measure the ambient temperature by measuring a spot on the inside of the enclosure that is least effected by any internal panel heat source.

4. Measure the temperature of the device specified.

5. Above-ambient temperature is calculated by subtracting the ambient temperature from the device temperature.

6. Record the results.

7. Close panels or doors carefully after the inspection is complete.

LEVEL II INSPECTION METHOD GUIDE SHEET

LEVEL II GUIDE SHEET - KEY NO. 3 (Continued)

COMPONENT: CONTROLS
CONTROL NUMBER: GS-II 25.02.13-3

Recommended Inspection Frequency

Do a Level II inspection each time a Level I inspection is made.

References

1. Maintenance Technology/September 1993; Write-up Title: *"Infrared Keeps All Systems Go"*

2. Raining - Agema Infrared Systems; *"Measurement of Excess Temperatures with Infrared Scanners"*

LEVEL II INSPECTION METHOD GUIDE SHEET

LEVEL II GUIDE SHEET - KEY NO. 4

COMPONENT: CONTROLS
CONTROL NUMBER: GS-II 25.02.13-4

Application

This guide applies to the investigation of the inside of an enclosure, containing bare, energized, electrical parts.

Special Safety Requirements

The following list of special safety requirements, beyond the requirements listed in the Master Safety Plan and System Safety Section, are to be observed in the performance of this inspection.

1. This inspection guide applies to enclosures containing live electrical parts having a potential of 600 volts or less above ground. If the enclosure contains circuitry of higher potential, do not use this inspection guide.

2. Any enclosure that is padlocked for safety reason is not to be opened unless okayed by the person having control of the key.

3. Inspector needs to carefully open, inspect the inside and close the enclosure without shutting down the equipment, and without creating a hazard to himself.

Inspection Actions

1. Open panels or doors carefully as required for doing the visual inspection.

2. Visually inspect for those physical damaged defects that are listed and tagged Level II Key No. 4.

3. Close panels or doors carefully after the inspection is completed.

Recommended Inspection Frequency

Do a Level II inspection each time a Level I inspection indicates one is required.

References

1. Sverdrup Corporation

LEVEL III INSPECTION METHOD GUIDE SHEET

LEVEL III GUIDE SHEET - KEY NO. 1

COMPONENT: BELT
CONTROL NUMBER: GS-III 25.02.03-1

Application

This guide applies to investigation of a conveyor belt that tracks to one side during operation.

Special Safety Requirements

The following is a list of special safety requirements beyond those listed in the Master Safety Plan and System Safety Section:

1. Notify affected personnel and obtain permission to take the unit out of service.

Inspection Actions

1. Inspect belt tension for proper adjustment.
2. Inspect tail pulley for proper alignment.
3. Inspect head pulley and tail pulley for loose hub.
4. Inspect belt for evidence of uneven stretching.
5. Inspect conveyor belt and associated components in accordance with the Manufacturer's Operation and Maintenance Manual.
6. Record the results.

Special Tools and Equipment

The following is a list of special tools and equipment, beyond the requirements listed in the Standard Tool Section.

1. Wrenches
2. Screwdrivers
3. Special tools as recommended by the equipment manufacturer.

Recommended Inspection Frequency

Do a Level III inspection when triggered by a Level I inspection.

LEVEL III INSPECTION METHOD GUIDE SHEET

LEVEL III GUIDE SHEET - KEY NO. 1 (Continued)

COMPONENT: BELT
CONTROL NUMBER: GS-III 25.02.03-1

References

1. Belt Conveyors for Bulk Materials, Second Edition, Conveyor Equipment Manufacturers Association

2. Marks' Standard Handbook for Mechanical Engineers, Eugene A. Avallone and Theodore Baumeister III, Ninth Edition, McGraw-Hill Book Company

LEVEL III INSPECTION METHOD GUIDE SHEET

LEVEL III GUIDE SHEET - KEY NO. 2

COMPONENT: PULLEYS, DRIVE/TAIL/TAKE-UP
CONTROL NUMBER: GS-III 25.02.05-2

Application

This guide applies to investigation of a pulley shaft with excess play within the bearing.

Special Safety Requirements

The following is a list of special safety requirements beyond those listed in the Master Safety Plan and System Safety Section:

1. Notify affected personnel and obtain permission to take the unit out of service.

Inspection Actions

1. Inspect bearing for worn or damaged inner or outer bearing ring.
2. Inspect bearing for worn balls, rollers, or other bearing surfaces.
3. Inspect bearing for worn or damaged retainer or cage.
4. Inspect shaft for wear or damage.
5. Inspect shaft and bearing in accordance with the Manufacturer's Operation and Maintenance Manual.
6. Record the results.

Special Tools and Equipment

The following is a list of special tools and equipment, beyond the requirements listed in the Standard Tool Section.

1. Wrenches
2. Screwdrivers
3. Special tools as recommended by the equipment manufacturer.

Recommended Inspection Frequency

Do a Level III inspection when triggered by a Level I inspection.

References

1. Marks' Standard Handbook for Mechanical Engineers, Eugene A. Avallone and Theodore Baumeister III, Ninth Edition, McGraw-Hill Book Company

LEVEL III INSPECTION METHOD GUIDE SHEET

LEVEL III GUIDE SHEET - KEY NO. 3

COMPONENT: TAKE-UP DEVICE
CONTROL NUMBER: GS-III 25.02.06-3

Application

This guide applies to investigation of a take-up device that does not operate.

Special Safety Requirements

The following is a list of special safety requirements beyond those listed in the Master Safety Plan and System Safety Section:

1. Notify affected personnel and obtain permission to take the unit out of service.

Inspection Actions

1. Inspect take-up device for severely worn or damaged parts.
2. Inspect device for broken parts.
3. Inspect device for improper adjustment or setting.
4. Inspect gravity type device for external interference with counterweights or cables.
5. Inspect for interruption in power supply to power operated take-up device.
6. Inspect for control anomaly in automatic take-up systems.
7. Inspect take-up device in accordance with the conveyor Manufacturer's Operation and Maintenance Manual.
8. Record the results.

Special Tools and Equipment

The following is a list of special tools and equipment, beyond the requirements listed in the Standard Tool Section.

1. Wrenches
2. Screwdrivers
3. Special tools as recommended by the equipment manufacturer.

Recommended Inspection Frequency

Do a Level III inspection when triggered by a Level I inspection.

References

1. Sverdrup Corporation

LEVEL III INSPECTION METHOD GUIDE SHEET

LEVEL III GUIDE SHEET - KEY NO. 4

COMPONENT: MOTOR/GEARMOTOR
CONTROL NUMBER: GS-III 25.02.10-4

Application

This guide applies to the investigation of electrical motors having excessive noise or vibration symptoms.

Special Safety Requirements

No special safety requirements are needed for the performance of this Level III inspection beyond those required in the Master Safety Plan and System Safety Section.

Inspection Actions

1. Verify the findings of Level I inspection by using the vibration/sound level meter and measure the velocity (inches/second, peak), displacement (mils, peak-peak) and noise (db). Compare reading with acceptable manufacturer tolerances.
2. Inspect bearings for defects or dryness.
3. Inspect electrical motor and load unit for misalignment.
4. Inspect electrical motor and load unit for proper mounting.
5. Inspect electrical motor and load unit for transfer of vibration from another source.
6. Inspect coupling for loose connection.
7. If none of the above is the problem, reference manufacturer troubleshooting guide for additional inspections or repairs to be made.

Special Tools and Equipment

The following is a list of special tools required beyond those listed in the Standard Tool Section.

1. Vibration/sound level meter, IDR Mechanalysis #1TC87

LEVEL III INSPECTION METHOD GUIDE SHEET

LEVEL III GUIDE SHEET - KEY NO. 4 (Continued)

COMPONENT: MOTOR/GEARMOTOR
CONTROL NUMBER: GS-III 25.02.10-4

Recommended Inspection Frequency

Do a Level III inspection when triggered by a Level II inspection.

References

1. KATO Engineering, Instruction Manual for Brushless Revolving Field Alternating Current Generators

LEVEL III INSPECTION METHOD GUIDE SHEET

LEVEL III GUIDE SHEET - KEY NO. 5

COMPONENT: MOTOR/GEARMOTOR
CONTROL NUMBER: GS-III 25.02.10-5

Application

This guide applies to the investigation of excessive sparking at the collector rings, commutator or brushes.

Special Safety Requirements

No special safety requirements are needed for the performance of this Level III inspection beyond those required in the Master Safety Plan and System Safety Section.

Inspection Actions

Level I Inspector will detect excessive sparking in the area of either the collector rings, commutator or brushes. Level III Inspector will perform the following tasks.

1. Verify that there is excessive sparking in the area of either the collector rings, commutator or brushes.
2. If there is a problem, stop the motor and evaluate the problems causing the sparking.
3. Classify the severity of the problem and recommend the procedure needed to correct the problem.
4. If the Level III Inspector can not evaluate the problem, recommend the next procedure required to further identify the correction procedure that needs to be followed.

Special Tools and Equipment

The following is a list of special tools required beyond those listed in the Standard Tool Section.

1. Wrenches
2. Feelers

Recommended Inspection Frequency

Do a Level III inspection when triggered by a Level II inspection.

References

1. *"Handbook of Building and Plant Maintenance, Forms and Checklists"* by Roger W. Liska and Judith Morrison Liska

LEVEL III INSPECTION METHOD GUIDE SHEET

LEVEL III GUIDE SHEET - KEY NO. 6

COMPONENT: MOTOR/GEARMOTOR
CONTROL NUMBER: GS-III 25.02.10-6

Application

This guide applies to the investigation of a hot terminal or device that is overheating from the flow of current through that terminal or device.

Special Safety Requirements

No special safety requirements are needed for the performance of this Level III inspection beyond those required in the Master Safety Plan and System Safety Section.

Inspection Actions

1. Verify the findings of Level II inspection by using the Infrared Scanner and measuring the temperatures of the device and terminals. If the device or terminals are not hot as indicated by the findings of Level II inspection, check the current flow through the device or terminals. Heat generated is proportionate to the square of the current. If there is little or no current flow through the device or terminal at the time of measurement, there will be no significant amount of heat generated.

2. For terminal connections, verify the type of conductor being terminated. If the conductor is an aluminum conductor, look for evidence of cold flow or melt down of conductor.

3. If there is evidence of cold flow or melt down of the aluminum conductor, the conductor should either be replaced or shortened and reconnected. When making new aluminum conductor terminations, a joint compound should be used.

4. If the terminal is loose it should be tightened. De-energize prior to attempting tightening of terminal connections.

5. If none of the above is the problem then there is an internal problem and an on-site analysis must be made to determine if additional inspections are to be made or the unit is to be replaced.

LEVEL III INSPECTION METHOD GUIDE SHEET

LEVEL III GUIDE SHEET - KEY NO. 6 (Continued)

COMPONENT: MOTOR/GEARMOTOR
CONTROL NUMBER: GS-III 25.02.10-6

Special Tools and Equipment

The following is a list of special tools required beyond those listed in the Standard Tool Section.

1. Infrared Scanner, Raytek, Inc., #PM2EM-L2
2. Torque wrench
3. Digital Multimeter, Fluke #1TC676

Recommended Inspection Frequency

Do a Level III inspection when triggered by a Level II inspection.

References

1. Maintenance Technology/September 1993; Write-up Title: *"Infrared Keeps All Systems Go"*
2. Raining - Agema Infrared Systems; *"Measurement of Excess Temperatures with Infrared Scanners"*

LEVEL III INSPECTION METHOD GUIDE SHEET

LEVEL III GUIDE SHEET - KEY NO. 7

COMPONENT: MOTOR/GEARMOTOR
CONTROL NUMBER: GS-III 25.02.10-7

Application

This guide applies to investigation of a gear reducer with irregular output rotation speed.

Special Safety Requirements

The following is a list of special safety requirements beyond those listed in the Master Safety Plan and System Safety Section:

1. Notify affected personnel and obtain permission to take the unit out of service.

Inspection Actions

1. Verify the findings of the Level I inspection by using the tachometer to measure the rotation speed (RPM) of motor and gear reducer output shaft. Compare reading with acceptable manufacturer tolerances.
2. Lock out the main power supply to the gear reducer.
3. Remove v-belt, drive chain, or otherwise disconnect the gear reducer output shaft from the conveyor.
4. Check if any rotating parts are rubbing against stationary parts by hand rotation of the gear reducer input shaft and noting any excessive physical effort necessary to hand rotate the reducer, scraping noises, or varied resistance to rotation.
5. Disassemble the gear reducer and inspect for foreign matter within the casing.
6. Check for wear and damage to casing, gears, and worm.
7. Inspect coupling for loose connection.
8. Inspect gear reducer in accordance with the manufacturer's Operation and Maintenance Manual.
9. Record the results.

LEVEL III INSPECTION METHOD GUIDE SHEET

LEVEL III GUIDE SHEET - KEY NO. 7 (Continued)

COMPONENT: MOTOR/GEARMOTOR
CONTROL NUMBER: GS-III 25.02.10-7

Special Tools and Equipment

The following is a list of special tools and equipment, beyond the requirements listed in the Standard Tool Section.

1. Wrenches
2. Screwdrivers
3. Tachometer
4. Special tools as recommended by the equipment manufacturer.

Recommended Inspection Frequency

Do a Level III inspection when triggered by a Level I inspection.

References

1. Sverdrup Corporation

2. KATO Engineering, "Instruction Manual for Brushless Revolving Field Alternating Current Generators"

LEVEL III INSPECTION METHOD GUIDE SHEET

LEVEL III GUIDE SHEET - KEY NO. 8

COMPONENT: MOTOR/GEARMOTOR
CONTROL NUMBER: GS-III 25.02.10-8

Application

This guide applies to investigation of a gear reducer that vibrates or makes a loud or unusual noise during operation.

Special Safety Requirements

The following is a list of special safety requirements beyond those listed in the Master Safety Plan and System Safety Section:

1. Notify affected personnel and obtain permission to take the unit out of service.

Inspection Actions

1. Verify the findings of the Level I inspection by using the vibration/sound level meter and measure the velocity (inches/second, peak), displacement (mils, peak-peak), and noise (dB). Compare reading with acceptable manufacturer tolerances.

2. Inspect motor, gear reducer, and load unit for transfer of vibration from another source.

3. Lock out the main power supply to the gear reducer.

4. Remove v-belt, drive chain, or otherwise disconnect the gear reducer output shaft from the conveyor.

5. Check if any rotating parts are rubbing against stationary parts by hand rotation of the gear reducer input shaft and noting any excessive physical effort necessary to hand rotate the reducer, scraping noises, or varied resistance to rotation.

6. Disassemble the gear reducer and inspect for foreign matter within the casing.

7. Check for wear and damage to casing, gears, and worm.

8. Worn bearings and coupling misalignment can cause the shaft to run off center. Check bearings for wear and, using the straight edge and feeler gauges or a dial indicator, check alignment of coupling halves.

9. Check shaft to determine if it is bent.

10. Inspect coupling for loose connection.

LEVEL III INSPECTION METHOD GUIDE SHEET

LEVEL III GUIDE SHEET - KEY NO. 8 (Continued)

COMPONENT: MOTOR/GEARMOTOR
CONTROL NUMBER: GS-III 25.02.10-8

Inspection Actions (Continued)

11. Check rotating elements to see if they are out of balance.
12. Check for excess grease or oil in bearing housing.
13. Check for lack of lubrication.
14. Check for improper installation of bearings.
15. Check for dirt or rust on bearings.
16. Check rigidity of motor and gear reducer mounting and base.
17. Inspect gear reducer in accordance with the manufacturer's Operation and Maintenance Manual.
18. Record the results.

Special Tools and Equipment

The following is a list of special tools and equipment, beyond the requirements listed in the Standard Tool Section.

1. Wrenches
2. Screwdrivers
3. Straightedge
4. Dial indicator
5. Vibration/sound level meter
6. Tapered thickness gauge or feeler gauges
7. Special tools as recommended by the equipment manufacturer.

Recommended Inspection Frequency

Do a Level III inspection when triggered by a Level I inspection.

References

1. Sverdrup Corporation
2. KATO Engineering, "Instruction Manual for Brushless Revolving Field Alternating Current Generators"

LEVEL III INSPECTION METHOD GUIDE SHEET

LEVEL III GUIDE SHEET - KEY NO. 9

COMPONENT: CONTROLS
CONTROL NUMBER: GS-III 25.02.13-9

Application

This guide applies to the investigation of a hot terminal or device that is overheating from the flow of current through that terminal or device.

Special Safety Requirements

No special safety requirements are needed for the performance of this Level III inspection beyond those required in the Master Safety Plan and System Safety Section.

Inspection Actions

1. Verify the findings of Level II inspection by using the Infrared Scanner and measuring the temperatures of the device and terminals. If the device or terminals are not hot as indicated by the findings of Level II inspection, check the current flow through the device or terminals. Heat generated is proportionate to the square of the current. If there is little or no current flow through the device or terminal at the time of measurement, there will be no significant amount of heat generated.

2. For terminal connections, verify the type of conductor being terminated. If the conductor is an aluminum conductor, look for evidence of cold flow or melt down of conductor.

3. If there is evidence of cold flow or melt down of the aluminum conductor, the conductor should either be replaced or shortened and reconnected. When making new aluminum conductor terminations, a joint compound should be used.

4. If the terminal is loose it should be tightened. De-energize prior to attempting tightening of terminal connections.

5. If none of the above is the problem than there is an internal problem and an on-site analysis must be made to determine if additional inspections are to be made or the unit is to be replaced.

LEVEL III INSPECTION METHOD GUIDE SHEET

LEVEL III GUIDE SHEET - KEY NO. 9 (Continued)

COMPONENT: CONTROLS
CONTROL NUMBER: GS-III 25.02.13-9

Special Tools and Equipment

The following is a list of special tools required beyond those listed in the Standard Tool Section.

1. Infrared Scanner, Raytek, Inc., #PM2EM-L2
2. Torque wrench
3. Digital Multimeter, Fluke #1TC676

Recommended Inspection Frequency

Do a Level III inspection when triggered by a Level II inspection.

References

1. Maintenance Technology/September 1993; Write-up Title: *"Infrared Keeps All Systems Go"*
2. Raining - Agema Infrared Systems; *"Measurement of Excess Temperatures with Infrared Scanners"*

25.03 HOPPERS AND BINS

DESCRIPTION

Hoppers and bins are a Sub-system of Coal Site Handling and Storage Systems. They are materials holding devices designed for storage of dry materials or for an intermediate stop in their conveyance.

SPECIAL TOOL AND EQUIPMENT REQUIREMENTS

No special tools are needed for the inspection of hoppers and bins beyond those listed in the Standard Equipment Requirements section of the introduction.

SPECIAL SAFETY REQUIREMENTS

No special safety requirements are needed for the inspection of the hoppers and bins, beyond the requirements listed in the Master Safety Plan and System Safety Section.

COMPONENT LIST

- 25.03.01 TRACK AND RECLAIM HOPPER

RELATED SUBSYSTEMS

Due to the related nature of the elements requiring inspection, the following systems and sub-systems should be reviewed for concurrent inspection.

01.01	FOUNDATION WALLS AND PIERS
10.00	BUILDING ELECTRICAL
10.02	LOW VOLTAGE DIST. SYSTEM 600V OR LESS
19.01	ROADWAYS
19.04	OPEN STORAGE AND HARD STANDS
20.01	TRACK

STANDARD INSPECTION PROCEDURE

Hopper and bin inspection requires both Level I and Level II inspections as part of the basic inspection process. Additional Level II or Level III inspections may be indicated or "triggered" by Level I defect observations. Any additional Level II inspections should be accomplished by the inspector at the time of the Level I inspection. Associated defects and observations, for each major component of the hoppers and bins, are listed in the inspector's Data Collection Device.

25.03 HOPPERS AND BINS

COMPONENTS

◆ 25.03.01 TRACK AND RECLAIM HOPPERS

Track and reclaim hoppers are round or rectangular containers with conical or funnel shaped bottoms. The hopper outlet will be equipped with an outlet valve. The hoppers are usually fabricated of carbon steel and mounted on legs made of steel pipe or structural shapes. Joints may be welded, bolted, or riveted.

Defect:	UOM	LEVEL II KEY	LEVEL III KEY
*** Corrosion of Top, Sides, and Bottom:**			
Observation:			
a. Surface corrosion (no pitting evident).	SF		
***{Severity L}			
b. Corrosion evidenced by pitting or blistering.	SF		
***{Severity M}			
c. Corrosion evidenced by holes or loss of base metal.	SF		
***{Severity H}			
Defect:			
*** Corrosion of Legs and Bracing:**			
Observation:			
a. Surface corrosion (no pitting evident).	SF		
***{Severity L}			
b. Corrosion evidenced by pitting or blistering.	SF		
***{Severity M}			
c. Corrosion evidenced by holes or loss of base metal.	SF		
***{Severity H}			
Defect:			
*** Corrosion of Outlet Valve:**			
Observation:			
a. Surface corrosion (no pitting evident).	SF		
***{Severity L}			
b. Corrosion evidenced by pitting or blistering.	SF		
***{Severity M}			
c. Corrosion evidenced by holes or loss of base metal.	SF		
***{Severity H}			

25.03 HOPPERS AND BINS

COMPONENTS (Continued)

◆ 25.03.01 TRACK AND RECLAIM HOPPERS (Continued)

Defect:	UOM	LEVEL II KEY	LEVEL III KEY
*** Connections on Top, Sides, and Bottom:**			
Observation:			
a. Loose bolts or rivets.	EA		
***{Severity M}			
b. Broken or missing nuts, bolts, or rivets.	EA		
***{Severity H}			
c. Cracked or broken weld.	EA		
***{Severity H}			
Defect:			
*** Connections on Legs and Braces:**			
Observation:			
a. Loose bolts or rivets.	EA		
***{Severity M}			
b. Broken or missing nuts, bolts, or rivets.	EA		
***{Severity H}			
c. Cracked or broken weld.	EA		
***{Severity H}			
Defect:			
*** Connections on Valve:**			
Observation:			
a. Loose bolts or rivets.	EA		
***{Severity M}			
b. Broken or missing nuts, bolts, or rivets.	EA		
***{Severity H}			
c. Cracked or broken weld.	EA		
***{Severity H}			

25.03 HOPPERS AND BINS

COMPONENTS (Continued)

◆ 25.03.01 TRACK AND RECLAIM HOPPERS (Continued)

Defect:	UOM	LEVEL II KEY	LEVEL III KEY
*** Physical Damage or Wear on Top, Sides, and Bottom:**			
Observation:			
a. Access panel is broken, bent, or damaged.	EA		
***{Severity L}			
b. Panels are worn, dented, bent, torn, or damaged.	EA		
***{Severity M}			
c. Panels worn with leakage of contents.	EA		
***{Severity H}			
d. Panels or sections are missing.	EA		
***{Severity H}			
e. Stiffening components bent, broken, or damaged.	EA		
***{Severity H}			
f. Stiffening components missing.	EA		
***{Severity H}			
g. Access panel is missing or inoperable.	EA		
***{Severity H}			
Defect:			
*** Physical Damage or Wear on Legs and Braces:**			
Observation:			
a. Members dented, bent, torn, or damaged.	EA		
***{Severity M}			
b. Members are missing.	EA		
***{Severity H}			
Defect:			
*** Physical Damage on Foundations for Legs:**			
Observation:			
a. Cracks less than 1/32" wide.	EA		
***{Severity L}			
b. Spalling 1" deep or less.	EA		
***{Severity L			
c. Conical shaped popout hole less than 1/2" diameter.	EA		
***{Severity L}			

25.03 HOPPERS AND BINS

COMPONENTS (Continued)

◆ **25.03.01 TRACK AND RECLAIM HOPPERS (Continued)**

Defect:	UOM	LEVEL II KEY	LEVEL III KEY
*** Physical Damage on Foundations for Legs (Continued):**			
d. Cracks less than 1/16" wide. ***{Severity M}	EA		
e. Spalling 1" deep or greater. ***{Severity M}	EA		
f. Conical shaped popout hole less than 2-1/2" diameter. ***{Severity M}	EA		
g. Cracks greater than 1/16" wide. ***{Severity H}	EA		
h. Spalling with re-bars showing. ***{Severity H}	EA		
Defect:			
*** Physical Damage or Wear to Valve:**			
Observation:			
a. Valve leaks. ***{Severity M}	EA		
b. Valve parts are dented, bent, or damaged. ***{Severity M}	EA		
c. Valves parts are broken. ***{Severity H}	EA		
d. Difficult manual operation. ***{Severity H}	EA		1
e. Power assisted valve with difficult operation. ***{Severity H}	EA		2
Defect:			
*** Paint Deterioration:**			
Observation:			
a. Paint is worn; metal not showing. ***{Severity M}	SF		
b. Paint is worn; metal is showing. ***{Severity M}	SF		
c. Paint is scratched, chipped, flaking, chalked, or blistered. ***{Severity M}	SF		

25.03 HOPPERS AND BINS

REFERENCES

1. DOE Condition Assessment Survey (CAS) Program, Deficiency Standards and Inspections Methods Manual, Volume 8

2. NAVFAC P-717.0, Engineered Performance Standards for Real Property Maintenance Activities, Preventive/Recurring Maintenance Handbook

3. Sverdrup Corporation

25.03 HOPPERS AND BINS

LEVEL II KEY	GUIDE SHEET CONTROL NUMBER
N/A	

LEVEL III KEY	GUIDE SHEET CONTROL NUMBER
1	GS-III 25.03.01-1
2	GS-III 25.03.01-2

LEVEL III INSPECTION METHOD GUIDE SHEET

LEVEL III GUIDE SHEET - KEY NO. 1

COMPONENT: TRACK AND RECLAIM HOPPERS
CONTROL NUMBER: GS-III 25.03.01-1

Application

This guide applies to the inspection of manual valves that are difficult to operate.

Special Safety Requirements

No special safety requirements are needed for the performance of this Level III inspection beyond those listed in the Master Safety Plan and in the Standard Safety Requirements section of the System Inspector's Guide.

Inspection Actions

1. Inspect for damaged threads on valve operator.
2. Check if valve operator is binding due to operator or slide plate being too tight.
3. Dismantle valve assembly. Depending on valve type, the valve body may or may not need to be removed from the hopper or bin bottom.
4. Check for dirt or foreign matter between the valve seat and the seating surfaces of the valve slide plate.
5. Inspect valve slide plate for damage.
6. Check if valve stem is bent.
7. Check for loose plates and guide assemblies.
8. Check for corrosion build-up that could interfere with valve operation.

Special Tools and Equipment

Listed below are special tools and equipment, beyond those listed in the Standard Tools section of the Introduction and System Inspector's Guide, that are required to perform this Level III inspection:

1. Special tools as recommended by the valve manufacturer
2. Wrenches
3. Screwdrivers

Recommended Inspection Frequency

Do a Level III inspection when triggered by a Level I inspection.

LEVEL III INSPECTION METHOD GUIDE SHEET

LEVEL III GUIDE SHEET - KEY NO. 1 (Continued)

COMPONENT: TRACK AND RECLAIM HOPPERS
CONTROL NUMBER: GS-III 25.03.01-1

References

1. DOE Condition Assessment Survey (CAS) Program, Deficiency Standards and Inspections Methods Manual, Volume 8

2. NAVFAC P-717.0, Engineered Performance Standards for Real Property Maintenance Activities, Preventive/Recurring Maintenance Handbook

LEVEL III INSPECTION METHOD GUIDE SHEET

LEVEL III GUIDE SHEET - KEY NO. 2

COMPONENT: TRACK AND RECLAIM HOPPERS
CONTROL NUMBER: GS-III 25.03.01-2

Application

This guide applies to the inspection of power assisted valves with difficult operation.

Special Safety Requirements

No special safety requirements are needed for the performance of this Level III inspection beyond those listed in the Master Safety Plan and in the Standard Safety Requirements section of the System Inspector's Guide.

Inspection Actions

1. Inspect for broken, bent, or damaged linkage between valve and operator.
2. Inspect for binding of operator linkage due to improper adjustment of operator or valve slide plate.
3. Inspect for damaged threads on linkage.
4. Inspect for inadequate lubrication of linkage.
5. Inspect for corrosion buildup that could interfere with linkage operation.
6. Inspect valve operator power source in accordance with the manufacturer's Operation and Maintenance Manual.
7. Dismantle valve assembly. Depending on valve type, the valve body may or may not need to be removed from the hopper or bin bottom.
    a. Check for dirt or foreign matter between the valve seat and seating surfaces of the valve slide plate.
    b. Check valve slide plate for damage.
    c. Check whether valve stem is bent.
    d. Check for loose valve plate and guide assembly.
    e. Check for corrosion build-up that could interfere with valve operation.

LEVEL III INSPECTION METHOD GUIDE SHEET

LEVEL III GUIDE SHEET - KEY NO. 2 (Continued)

COMPONENT: TRACK AND RECLAIM HOPPERS
CONTROL NUMBER: GS-III 25.03.01-2

Special Tools and Equipment

Listed below are special tools and equipment, beyond those listed in the Standard Tools section of the Introduction and System Inspector's Guide, that are required to perform this Level III inspection:

1. Special tools as recommended by the motor manufacturer
2. Wrenches
3. Screwdrivers

Recommended Inspection Frequency

Do a Level III inspection when triggered by a Level I inspection.

References

1. DOE Condition Assessment Survey (CAS) Program, Deficiency Standards and Inspections Methods Manual, Volume 8

2. NAVFAC P-717.0, Engineered Performance Standards for Real Property Maintenance Activities, Preventive/Recurring Maintenance Handbook

APPENDIX A

ABBREVIATIONS

AFR	U.S. Air Force Regulations
Amb.	Ambient
Amp	Ampere
ANSI	American National Standards Institute
AREA	American Railway Engineering Association
°C	Celsius (Centigrade)
CAIS	Condition Assessment Information Survey
CAS	Condition Assessment Survey
CEMA	Conveyor Equipment Manufacturers Association
dB	Decibels
DCD	Data Collection Device
Dia.	Diameter
DOD	U.S.Department of Defense
DOT	U.S. Department of Transportation
EA	Each
Elect.	Electrical
e.g.	For example
Ft.	Feet
GS-II	Guide Sheet, Level II Inspection Method
GS-III	Guide Sheet, Level III Inspection Method
HP	Horsepower
HR	Hour

APPENDIX A

in.	Inches
IU	Inspection Unit
LF	Linear Feet
Mils	1/1000 inch
NAVFAC	Naval Facilities Engineering Command
NEMA	National Electrical Manufacturers Association
No.	Number
OSHA	U.S. Occupational Safety and Health Administration
PE	Professional Engineer
Re-bars	Reinforcing bars
SF	Square Feet
Temp.	Temperature
TM	U.S. Army Technical Manual
UOM	Unit of Measure
US	United States
V	Volts
WBS	Work Breakdown Structure
<	Less than
>	Greater than
"	Inch or Inches

APPENDIX B

GLOSSARY

Ambient	An encompassing atmosphere - existing or present on all sides.
Alignment	The position of parts, or components, in relation to each other.
Abutment	A structure composed of stone, concrete, brick, or timber supporting the end of a single span or the extreme end of a multi-span superstructure and, in general, retaining or supporting the approach embankment placed in contact therewith.
Anchor Bolt	Bolts used for fastening the conveyor or other equipment to the floor, pit, or other foundation, or to ceiling or overhead structure when the conveyor is suspended.
Angular Transverse Separation	Same as Transverse Separation except break is at an angle.
Anomaly	Deviation from the common rule, something different, abnormal, peculiar, not easily classified.
Automatic	Self-acting and/or self-regulating mechanism that performs a predetermined function. The term automatic is frequently misused to imply some degree of control sophistication or automation. Specific description of the intended automatic function is necessary for a proper understanding.
Automatic Take-up	A take-up having provisions which permit it to automatically compensate for stretch, shrink or wear of belts, cables, chains, etc., and to maintain proper tensions.
Axle	A shaft, either rotating or non-rotating on which are mounted driving or supporting wheels or rollers.
Bearing	A machine part in or on which a journal, shaft, axle, pin, or other part rotates, oscillates or slides.
Belt Carcass	The belt carcass is the tension element of a conveyor belt. It is the primary reinforcement for belt tear resistance, load support, and mechanical fastener-holding ability. Most conveyor belt carcasses are made of one or more plies of woven fabric. Some high-tension carcasses employ a single layer of parallel steel cables.
Belt Coating (lagging)	A smooth or embossed covering or lagging applied to a conveyor belt to protect the belt from the weather or the conveyed product or to increase friction between the belt and the drive pulley or the conveyed product.

APPENDIX B

Belt Conveyor	An endless fabric, rubber, plastic, leather, or metal belt operating over suitable drive, tail end and bend terminals and over belt idlers or slider bed for handling bulk materials, packages, or objects placed directly upon the belt.
Bin	A container for storing material.
Brake	A device for slowing down conveyor components; for bringing conveyor equipment to a controlled stop; for holding traveling or traversing equipment in a selected location; for preventing reverse travel; or for controlling overspeed due to the action of gravity.
Broken Base	A progressive fracture in the base of the rail, with a vertical separation or split. The separation is substantially longitudinal, but usually turns to the base of the rail.
Bucket	A suitable shaped vessel attached to a chain or a belt and used to convey materials in a bucket conveyor.
Carrying Roller (Idler)	The conveyor roller upon which the conveyor belt or the object being transported is supported.
Chain	A series of links pivotally joined together to form a medium for conveying or transmitting motion or power. General classes of chain common to the conveyor art are: detachable, pintle, combination, roller, rivetless, coil, inverted tooth, and bar link chains.
Chain Drive	A power transmission device employing a drive chain and sprockets.
Coated (Lagged) Pulley	A pulley covered with a smooth or embossed material, usually resilient, to reduce wear on the pulley face, effect a self-cleaning action on the pulley surface, or increase the coefficient of friction between the pulley and the belt.
Coefficient of Friction	A numerical expression of the ratio between the force of contact existing between two surfaces and the resistant force tending to oppose the motion of one with respect to the other. The coefficient of friction is used in determining the power necessary to drive a machine; to determine the slope angles used in hoppers, bins, chutes, and bunkers; or to determine the maximum angle of inclination for a conveyor.
Concrete	A mixture of aggregate, water, and a binder, usually portland cement, which hardens to a stone-like mass.
Conveyor Belt	A belt used to carry materials and transmit the power required to move the load being conveyed.

APPENDIX B

Conveyor Housing	An independent enclosure designed to protect the complete conveyor.
Corrosion	The general disintegration and wasting of surface metal or other material through oxidation, decomposition, temperature, and other natural agencies.
Corroded Base	The decaying or corroding of the metal on the web or base of the rail which results in irregular pits or cavities. Can be recognized as pits or cavities on the upper web or base of the rail. Severest corrosion usually occurs underneath the base of the rail and is, therefore, not visible whenever the rail is in place in track and not visible at all in road crossings.
Counterweighted Take-Up	A take-up mechanism where the adjustment is made automatically by the potential energy in weights.
Cross Level Deviations	Cross level deviation is the difference in elevation between the top surfaces of two rails measured at right angles to the track. Cross level measurements shall include any evidence of vertical movement under load.
Drive	An assembly of the necessary structural, mechanical and electrical parts which provide the motive power for a conveyor.
Drive Belt	A belt which is used to transmit power or motion from one part to another.
Drive Chain	A chain used to transmit power.
Drive Pulley	A pulley mounted on the drive shaft that transmits power to the belt with which it is in contact.
Efflorescence	A white deposit on the concrete caused by crystallization of soluble salts (calcium chloride) brought to the surface by moisture in the concrete. Efflorescence is caused by moisture absorption and flow. It is an indication that the concrete is contaminated
Elastomer	A natural or synthetic rubber-like material.
End Batter	Damage caused by wheels striking the rail end. Appears as damage to or a depression in the top surface of the rail head at the end of the rail.
Expansion Joint	A joint construction arranged to permit sliding of joining members, yet providing continuity of support. Its purpose is to accommodate change in length caused by expansion or contraction.

APPENDIX B

Flaking (of rail)	A progressive horizontal separation on the running surface near the gage corner often accompanied by scaling or chipping. Flaking should not be confused with shelling, as flaking occurs only on the running surface near the gage corner and is not as deep as shelling. Flaking is not a critical defect.
Flange	The horizontal parts of a rolled I-shape beam or of a built-up girder extending transversely across the top and bottom of the web.
Frame	The structure which supports the machinery components of a conveyor.
Gage (of track)	The distance between the gage lines, measured at right angles to the rails. Standard gage is 4 feet 8 1/2 inches. A gage is also a tool or device to measure or establish the gage of the track.
Gage Line	A line 5/8 inches below the top of rail along the side nearer the center of the track.
Gage Wear (of rail)	See Wear.
Gearmotor	A motor and speed reducer combination where the two units are flanged for connection to each other and have one output shaft; or where the two units are closely coupled with the motor resting on a base which is an integral part of the speed reducer housing.
Gear Reducer	A power transmission mechanism designed to provide a speed for the driven equipment less than that of the prime mover. They may be either constant speed or adjustable speed. They are generally totally enclosed to retain lubricant and prevent the entry of foreign material.
Gravity Take-up	See Counterweighted Take-Up.
Guard	A covering or barricade provided for safety purposes such as gear, chain, and coupling guards. It may also consist of protective devices provided in the proximity of a hazardous condition for protection of equipment or personnel.
Handrail	Any safety railing for protection of personnel.
Head Pulley	The pulley at the head or delivery end of the conveyor.
Head Wear (of rail)	(See Wear)

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Hopper	A container having a funnel-shaped bottom, or a bottom reduced in size, narrowed, or necked to receive material and direct it to a conveyor, feeder, or chute.
Hydraulic Take-up	An automatic take-up mechanism where tension is maintained by the use of hydraulic cylinders.
Ladder	An appliance designed for use in ascending or descending at an angle with the horizontal exceeding 60°, generally consisting of two side pieces called rails, joined at intervals by cross pieces called steps.
Lagging	A smooth or embossed covering or coating applied to a pulley to reduce belt slippage, wear, and prevent material build-up.
Lagged Pulley	A pulley having the surface of its face covered with lagging.
Lubricator, automatic	A device used to automatically lubricate the chain, trolley wheels or other conveyor components.
Maintenance	Upkeep of the property or equipment including regular programmed inspection, lubrication, adjustment, and repair or replacement of working parts as required.
Masonry	A general term applying to abutments, piers, retaining walls, arches, and allied structures built of stone, brick, or concrete and known correspondingly as a stone or concrete masonry.
Mortar	An intimate mixture, in a plastic condition, of cement or other cementious material with fine aggregate and water, used to bed and bind together the quarried stones, bricks, or other solid materials composing the major portion of a masonry construction or to produce a plastic coating upon such constructions.
Pitting	Development of relatively small cavities in a surface; in concrete, localized disintegration, such as a popout; in steel, localized corrosion evident as minute cavities on the surface.
Pneumatic Take-up	An automatic take-up in which tension is maintained by the use of air cylinders.
Popout	Conical fragment broken out of concrete surface. Normally about one inch in diameter. Shattered aggregate particles usually found at bottom of hole.
Primary Members	The main load carrying members in a structure or superstructure.

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Rail	A rolled steel shape, commonly a T-section, designed to be laid end to end in two parallel lines on cross ties or other suitable supports to form a track for railway rolling stock.
Reinforcing Bar (Re-bar)	A steel bar, plain or with a deformation surface, which bonds to the concrete and supplies tensile strength to the concrete.
Return Belt	The belt, strand, or run return to the loading point.
Return Roller (Idler)	An idler or roller supporting the return run of the belt.
Roller	(1) A round part free to revolve about its outer surface. The face may be straight, tapered, crowned, concave or flanged, corrugated, ribbed or fluted; (2) The rotating element upon which a conveyor belt or chain or the object being transported is carried.
Rough Top Belt	A belt cover intentionally made with irregular ridges or projections to produce a broken surface for greater traction or carrying abilities. Used for inclined service.
Safety Cage	A guard built around a ladder.
Screw Take-up	(1) A take-up in which movement of the bearing block is accomplished by means of a screw; (2) A take-up assembly having provision for manual adjustment by one or more screws to compensate for stretch, shrink, or wear of a conveying or power transmission medium
Secondary Member	A member that is carried by other members and does not resist traffic load. The function of a the secondary member is to brace or stiffen the primary members.
Sheave	A wheel with a grooved rim used with ropes, cables, chains, belts, etc.
Shelling (of rail)	A progressive horizontal separation which may crack out at any level on the gage side but generally at the gage corner. It extends longitudinally not as a true horizontal or vertical crack, but at an angle related to the amount of rail wear. Shelling is not a critical defect. Appears in the track as one or more of the following: a. Dark spots irregularly spaced on the gage side of the running rail. b. Longitudinal separation at one or several levels in the upper gage corner with discoloration from bleeding. c. If the rail has been turned, the shelly spots will appear on the field side with an irregular overhanging lip of metal similar to flowed rail.

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Slide Gate	A type of gate or valve in which the gate plate slides in guides.
Slider Bed	A stationary surface on which the carrying run of a belt conveyor slides.
Snub Roller (Idler)	Any roller used to increase the arc of contact between a belt and drive or tail pulley.
Spalling (of concrete)	A spall is a roughly circular or oval depression in the concrete. Spall results from the separation and removal of a portion of the surface concrete, revealing a fracture roughly parallel to the surface. Spall can be caused by corroding reinforcement and friction from thermal movement.
Splice (Belt)	A joint or junction made by lapping or butting, straight or on a bias, and held together through vulcanization or mechanical means.
Spring Take-up	A take-up mechanism where adjustments are made automatically by the potential energy of springs.
Sprocket	A wheel with suitable shaped and spaced cogs or teeth to engage with the links of a chain.
Stretch	The temporary change in length of a conveying medium such as belt, chain, or cable. Stretch varies directly with tension in the conveying media. Stretch is usually measured as a percentage of length and is a function of the working load, environmental and ambient conditions.
Tail Pulley	A pulley mounted at the tail or loading end of a conveyor.
Take-up Device	The assembly of the necessary structural and mechanical parts which provides the means to adjust the length of belts, cables, chains, etc., to compensate for stretch, shrinkage, or wear and to maintain proper tension.
Take-up Pulley	A pulley mounted on the take-up shaft of a take-up device.
Tension	The actual pull (force) existing at any point in the belt or chain.
Track	An assembly of rails, ties, and fastenings over which cars, locomotives and trains are moved.
Transverse Separation	A complete perpendicular break of the head, web, and base of the rail. May be as a hairline crack running around the rail at the break with one or both of the rail ends battered down.

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Truss	A jointed structure made up of individual members arranged and connected, usually in a triangular pattern, so as to support longer spans.
Valve	A device or structure through which material is permitted to pass. The flow may be stopped or regulated by means of a gate.
V-belt	A belt with a trapezoidal cross section for operation in grooved sheaves permitting wedging contact between the belt sides and groove sides for power transmission.
Wear (On rail)	Rail wear measurements shall consist of a vertical head wear measurement and a side wear (gage wear) measurement. Vertical head wear (head wear) is measured at the center of the rail. Horizontal head wear (gage wear) is measured at a point 5/8 inches below the top of the rail.
Weathering	The effects caused by light, water, and heat.
Weld	A joint between pieces of metal at faces which have been made plastic by heat or pressure.
Wheel	A disc or circular frame which may be solid, built-up, or formed and which is capable of turning on, or with a central axis.
Wingwall	The retaining wall extension of an abutment intended to restrain and hold in place the side slope material of an approach roadway embankment.

APPENDIX C

LIFE CYCLE

25 COAL SITE HANDLING AND STORAGE

25.01 COAL DUMP TRESTLE, BOTTOM DUMP

Coal Dump Trestle	35 YRS

Source:
American Railway Engineering Association (AREA)

25.02 CONVEYORS, COAL

Conveyor	20 YRS
Belt	20 YRS
Bearings	10-15 YRS
Buckets & Chain	10-15 YRS

Source:
Robert & Schaefer Company

25.03 HOPPERS AND BINS

Hoppers and Bins	5 YRS

Source:
Oscar Mayer Company